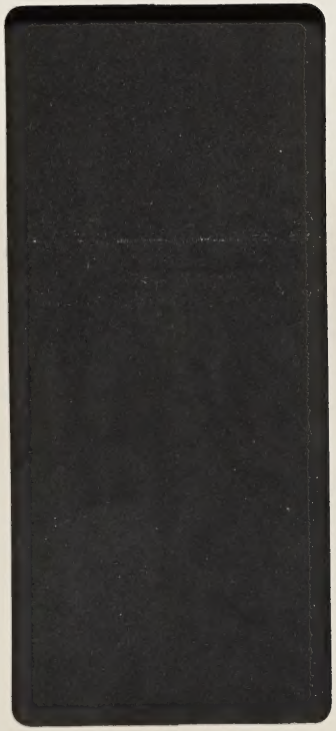
OPERATION
AND
SERVICE MANUAL

MODEL PD-9B

NEW LOCATION
TELONIC INDUSTRIES, INC.
BOX 277
LAGUNA BEACH, CALIFORNIA
92652



MANUAL DIFFERENCE SHEET

FOR MODEL PD-9B

The Model PD-9B Sweep/Signal Generator is a unit covering a frequency range of 225 - 400 MHz and consists of a chassis identical to the PD-7B in all areas except those designated below.

1. Specifications (page 1-1)

a)	Center Frequency Range	225-400 MHz
b)	Sweep Frequency Range	225-400 MHz

2. Filter Assembly (page 5-11/5-12)
   Z802 is filter part number TLP-415-4AB

3. Any tests indicated below 225 MHz should be performed at 225 MHz.

MODEL PD-9B

OPERATION
AND
SERVICE MANUAL
NO. 0398

MODEL PD-7B SWEEP/SIGNAL GENERATOR

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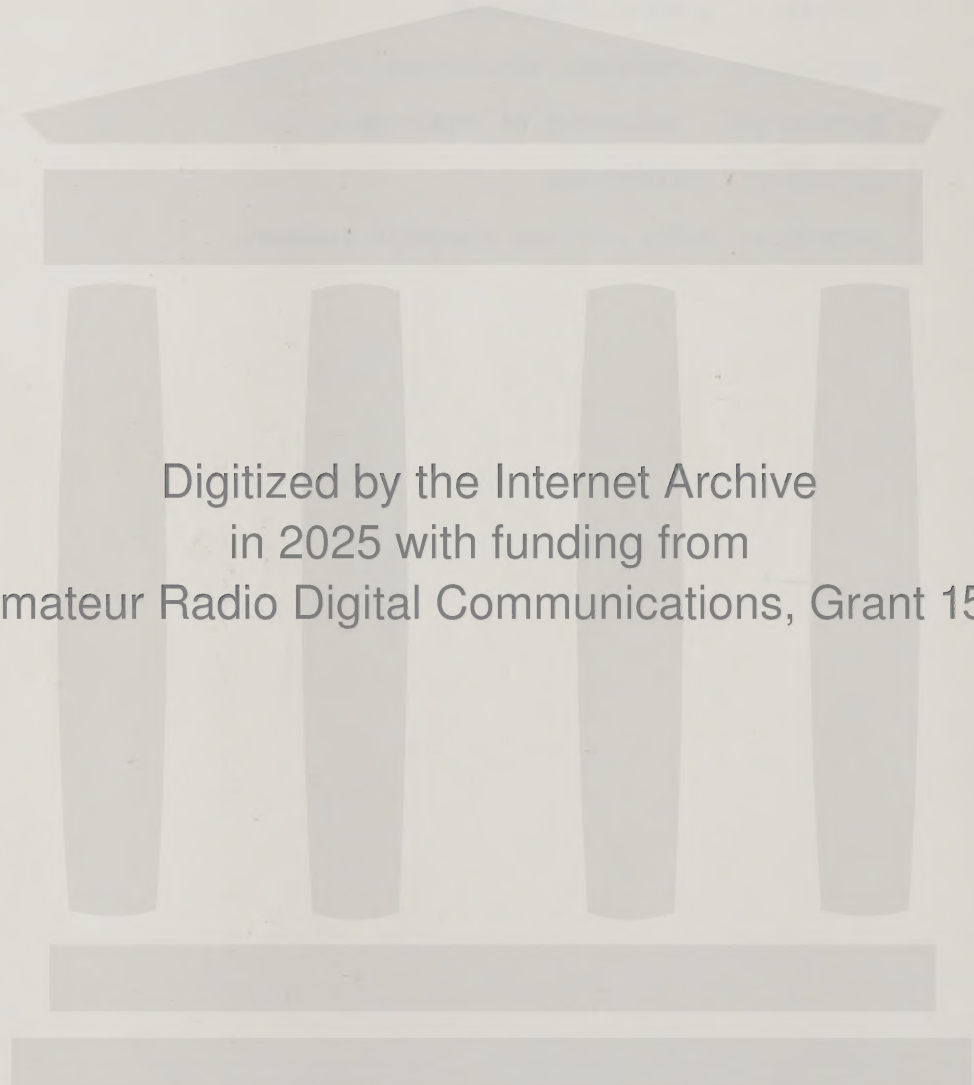

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SECTION I

GENERAL INFORMATION

1-1. SPECIFICATIONS.

1-2. Table 1-1. lists the specifications for the PD-7B SWEEP/SIGNAL GENERATOR.

TABLE 1-1.

Specifications	
Sweep Generator:	
Center Frequency Range-	200 to 375 MHz
Sweep Frequency Range-	190 to 385 MHz
Sweep Width-	0.2 to 10% of center frequency
Peak RF Output Power (50Ω load)	
Sweep Functions	
Attenuator out-	8 watts minimum, 40 watts maximum
Attenuator in-	4 watts maximum
CW Functions	
Attenuator out-	4 watts minimum, 20 watts maximum
Attenuator in-	2 watts maximum
Attenuation-	3 to 63 dB, 1 dB steps
Output Z-	0 ohms nominal
Amplitude Level Variation-	
(A) Swept or CW Modes	±0.5 dB (50Ω load with ATTENUATOR switch in the OUT position).
(B) Modulated Mode	Peak amplitude variation ±0.5 dB
Meter Accuracy-	±2 dB of measured output
Sweep Rate-	Line frequency (50-60 Hz)
Scope Horizontal Sweep-	Approx 14 V peak-to-peak
Display Linearity-	Normally below 1.2:1
Internal Modulation-	Internal 1 kHz square wave source may be used to modulate sweep and CW signals
Line Power-	115/230 VAC, 50-60 Hz, 200 watts
Marker System-	External marker input. Provisions for 5 plug-in "C" markers or 2 "CDH" and 1 "C" type marker

1-3. DESCRIPTION. (Refer to figure 1-1.)

1-4. The PD-7B SWEEP/SIGNAL GENERATOR employs tuned grid, tuned plate, tank circuits with a high power UHF triode oscillator tube. This unit provides a tunable 200 to 375 MHz oscillator with variable sweep width of 0.2 to 10% of center frequency. The PD-7B also contains a birdy-by-pass marker system, automatic level control, horizontal deflection output voltage, continuous monitoring of oscillator grid current and peak RF power output, and circuitry to limit oscillator tube grid current within safe operating range.

1-5. The PD-7B is especially useful for solid state frequency multipliers where large amounts of drive power is required due to the minimum output of eight watts peak and for checking high-power attenuators. Maximum output as high as 30 watts is possible at certain frequencies.

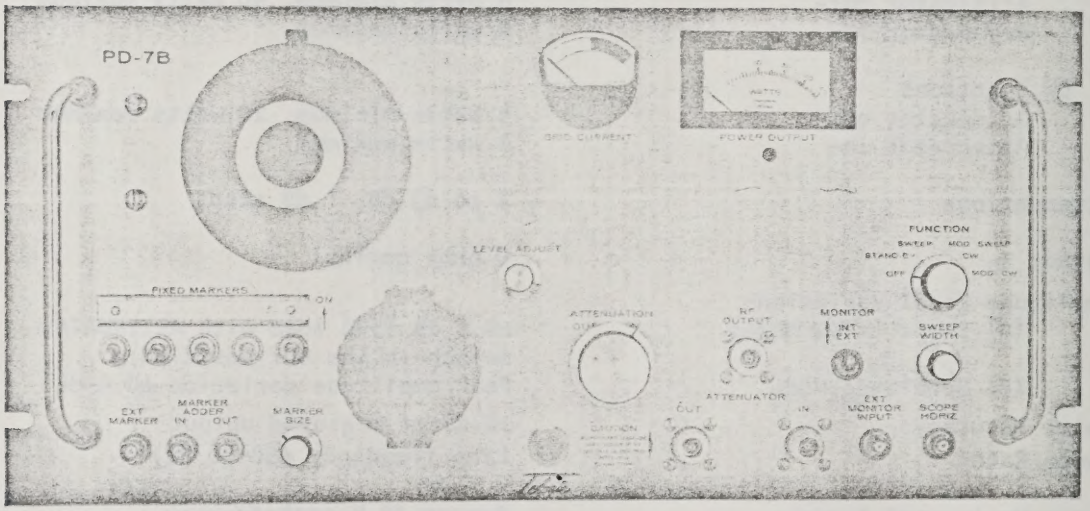


Figure 1-1. PD-7B SWEEP/SIGNAL GENERATOR

SECTION II

OPERATING INSTRUCTIONS

2-1. GENERAL.

2-2. This section provides the complete functional description and operating instructions for the PD-7B SWEEP/SIGNAL GENERATOR.

2-3. CONTROL PANEL DESCRIPTION.

2-4. FRONT PANEL. Table 2-1. provides a complete functional description of all Front Panel controls and connectors.

TABLE 2-1.

Front Panel Control and Connector Functional Description	
CONTROLS	
FREQUENCY DIAL-	Indicates frequency of CW oscillator and Sweep oscillator at minimum sweep width
ATTENUATOR OUT-IN	
OUT-	Provides a control to disable all attenuation
IN-	Provides a control to enable the 0-59 dB rotor attenuator and adds 3 dB to total attenuation
ATTENUATOR-	Large (outer) knob provides a control to vary attenuation from 0 to 9 dB in 1 dB steps Smaller (inner) knob provides a control to vary attenuation from 0 to 50 dB in 10 dB steps
FIXED MARKERS-	Provides a means to switch B+ to the plug-in markers
MARKER SIZE-	Provides a control to adjust the amplitude of the plug-in and external markers
FUNCTION SWITCH-	Selects internal control circuitry for the following functions: 1. AC power on-off 2. Stand-by 3. Sweep 4. Mod sweep 5. CW 6. Mod CW

TABLE 2-1. (Cont)

SWEEP WIDTH-	Provides a control to adjust the sweep width
LEVEL ADJUST-	Provides a control to set the unattenuated RF level output when the ATTENUATOR OUT-IN control is in the OUT position
MONITOR $\frac{\text{INT}}{\text{EXT}}$ -	Provides a switch to select internal or external monitor operation when ATTENUATOR OUT IN control is in the OUT position
GRID CURRENT METER-	Indicates safe oscillator grid current range
POWER OUTPUT METER-	Indicates power output in watts
CONNECTORS	
RF OUTPUT-	Provides a connector for CW and SWEEP output
EXT MARKER-	Provides a connector for insertion of an external signal to produce a birdy marker on the RF output
MARKER ADDER	
IN-	Provides a connector for the demodulated signal from the device under test, enabling the marker signal to be superimposed upon this demodulated signal
OUT-	Provides connection to the oscilloscope Vertical input for viewing the demodulated signal and markers
SCOPE HORIZ-	Provides connection to the oscilloscope Horizontal input
ATTENUATOR	
OUT-	Provides connection from attenuators (when used)
IN-	Provides connection to internal attenuators
EXT MONITOR INPUT-	Provides connection for external monitor input for leveling when ATTENUATOR OUT-IN control is in the OUT position

2-5. ADJUSTMENT LOCATION AND DESCRIPTION. (Refer to figure 2-1.)

2-6. Table 2-2. provides a complete functional description and location of the internal Sweep Width, Meter Calibration, and Output adjustments of the PD-7B.

TABLE 2-2.

Adjustment Location and Functional Description	
Potentiometer	Functional Description
R302-	Provides a control to set maximum power limit to Front Panel Level Control (with FUNCTION switch set to a SWEEP function)
R303-	Provides a control to set maximum power limit to Front Panel Level Control (with FUNCTION switch set to a CW function)
NOTE After adjusting R302 or R303, check Rear Panel level control setting for specified power level. (Refer to Table 1-1. - Peak RF Output Power - for specified level)	
R802-	Provides a control to vary the sweep width limit
R322-	Provides a control to adjust POWER OUTPUT meter reading (FUNCTION switch in MOD CW position)
R321-	Provides a control to adjust POWER OUTPUT meter reading (FUNCTION switch in CW position)
R320-	Provides a control to adjust POWER OUTPUT meter reading (FUNCTION switch in MOD SWEEP position)
R319-	Provides a control to adjust POWER OUTPUT meter reading (FUNCTION switch in SWEEP position)

Figure 2-1. Adjustment Location

2-7. PRE-OPERATION.

2-8. The following pre-operation procedure must be performed before operating the PD-7B.

a. Connect the PD-7B to the unit under test as shown in figure 2-2.

CAUTION

The PD-7B high voltage transformer's dual primaries are normally wired in parallel for use on 115 volt power lines. When desired, the windings can be readily reconnected in series for 230 volt operation.

NOTE

Refer to Section IV, MAINTENANCE, for 230 volt conversion procedure.

2-9. OPERATING PROCEDURE.

2-10. ATTENUATION CONTROL IN THE OUT POSITION.

a. Connect external power cable to 115/230 volt receptacle on rear panel.

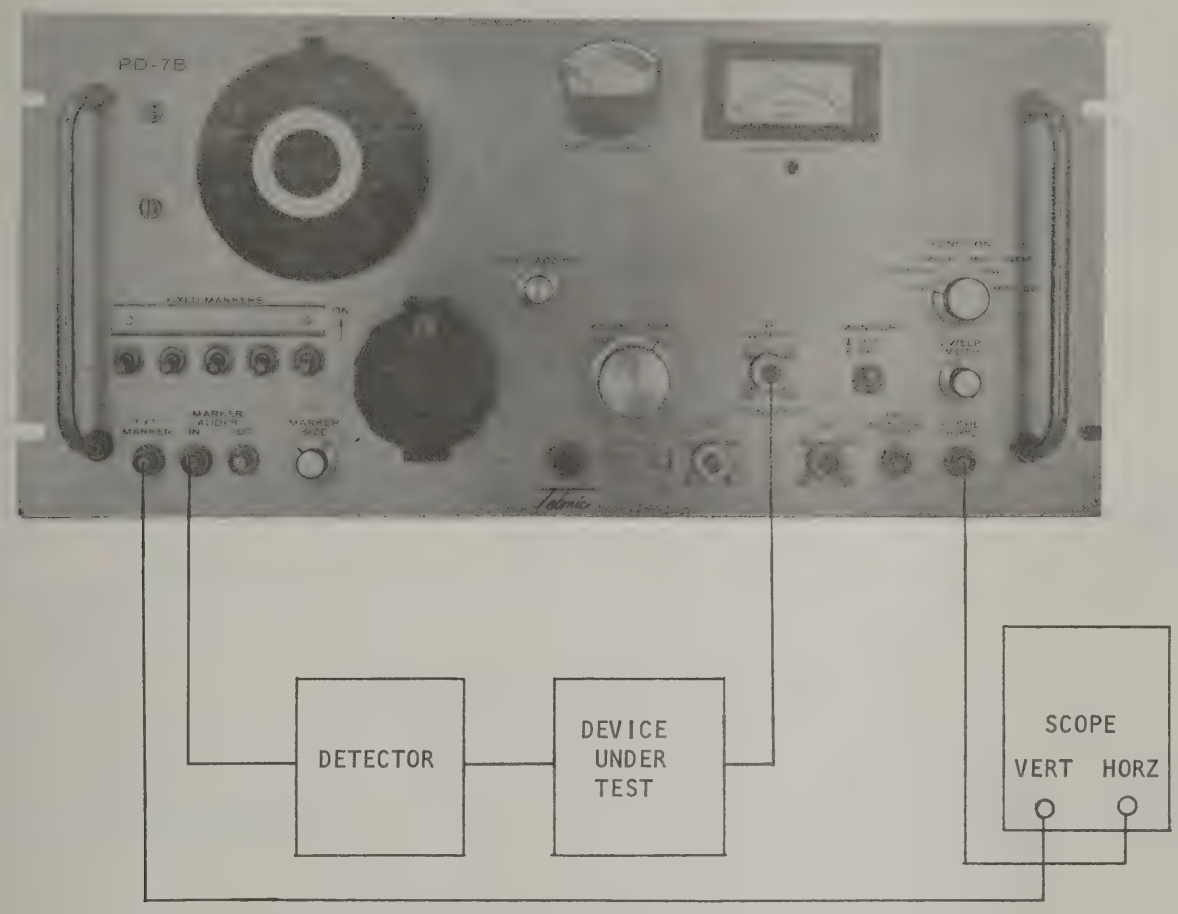


Figure 2-2. Typical Test Connections

b. Set the LEVEL ADJUST control to the maximum counterclockwise position.

c. Set MONITOR switch to INT.

NOTE

RF output connector must be terminated at all times when operating the PD-7B to prevent damage to the monitor and sweep oscillator by excessive VSWR.

d. Set the FUNCTION switch to SWEEP and allow a sixty second warm-up period.

e. Set LEVEL ADJUST control for the desired power output indication.

CAUTION

Do not exceed maximum power rating of detector or device under test.

f. Adjust SWEEP WIDTH control for the desired sweep width.

g. Set Sweep Frequency dial to the desired sweep frequency.

h. Turn on desired FIXED MARKERS and adjust MARKER SIZE control for convenient marker display.

2-11. ATTENUATOR CONTROL IN THE IN POSITION.

CAUTION

Before proceeding with step a., ensure the RF output is not connected to the attenuator output as permanent damage to the PD-7B Monitor and Attenuator will result.

a. Connect an RF jumper cable between the RF OUTPUT connector and the ATTENUATOR IN connector.

CAUTION

Ensure RF jumper is connected before turning the PD-7B FUNCTION control to a SWEEP or CW function.

b. Set the Attenuator controls for the desired attenuation.

c. Set the FUNCTION switch to SWEEP and allow a sixty second warm-up period.

d. Adjust the SWEEP WIDTH control for desired sweep width.

e. Set the Sweep Frequency dial to the desired sweep frequency.

f. Turn on desired FIXED MARKERS and adjust MARKER SIZE control for convenient marker display.

NOTE

An external RF or CW signal may be coupled in thru Front Panel EXT MARKER connector to produce a birdy marker on the RF output display.

SECTION III

PRINCIPLES OF OPERATION

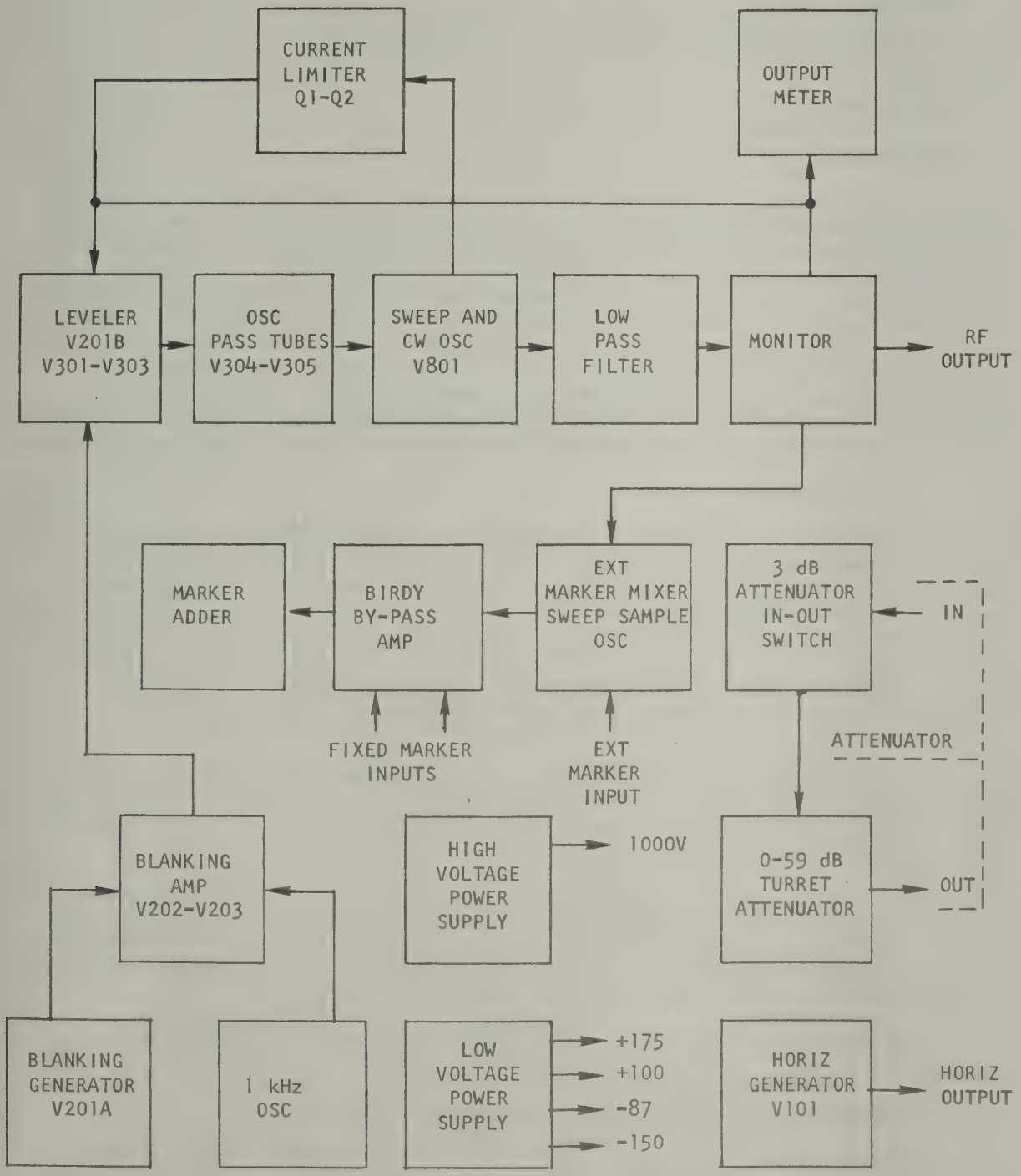


Figure 3-1. PD-7B SWEEP/SIGNAL GENERATOR Block Diagram

3-1. GENERAL.

3-2. This section provides a description of the major circuits of the PD-7B SWEEP/ SIGNAL GENERATOR.

3-3. POWER SUPPLY.

3-4. HIGH VOLTAGE.

3-5. The high voltage required for high power RF oscillator operation is produced by power transformer T51. This AC voltage is rectified by silicon diodes CR51 and CR52 which are connected as a full wave rectifier. Filtering is provided by the choke input filter consisting of inductor L51 and capacitor C53. A filtered voltage of approximately 1000 volts is present at terminal 62 in the high voltage power supply section. A time delay relay, located near T51, assures sufficient warm-up time of the main filament circuit before the high voltage power supply is activated. Count down of the time delay begins when the Front Panel FUNCTION switch is rotated from the OFF position. A stand-by position is provided to disable the high voltage without repetition of the time delay. A two amp fuse, F1, located in the primary of T51 protects the high voltage circuitry from overload.

3-6. LOW VOLTAGE.

3-7. The 140 VAC output of power transformer T1 is fed into half wave voltage doubler silicon rectifying elements CR1 and CR2. B+ is taken off the capacity input filter to provide +375 volts unregulated to the plates of B+ 175V regulator pass tube V4 and B+ 100V pass tube, V5.

3-8. B+2 is the output of the electronic regulator circuit consisting of vacuum tubes V3 and V4 and associated circuitry. This circuit provides +175 volts regulated output. Potentiometer R17, B+ ADJ, controls the operating point of regulator amplifier tube, V3, and is set for proper B+2 output voltage.

3-9. B+3 is obtained by biasing the grid of V5 at approximately +85 volts, which causes current to flow through cathode resistor R23. The voltage, at Pin 3 of V5, maintains regulation due to low impedance characteristics of the cathode follower circuit and provides approximately 100 volts output.

3-10. The B- voltages are obtained by the half wave voltage doubler consisting of diodes CR3 and CR4. Two regulator tubes, V1 and V2, maintain a negative DC output of 150 and 85 volts respectively. V2 serves as a reference voltage regulator for the +175 (B+2) volt electronic regulator. V1 supplies B- to the leveler, blanking, horizontal generator circuits and the grid current limit circuit.

3-11. Resistor R1 acts as a fuse, protecting transformer T1 and the rectifiers from overload.

3-12. BLANKING AND 1 kHz OSCILLATOR. (Refer to figure 3-2.)

3-13. The purpose of the blanking circuit is to produce a zero reference line in the Sweep and Mod Sweep functions. This zero reference is produced by removing B+ from the sweep oscillator during the sweep retrace. A square wave generating

circuit, consisting of tubes V201A and V202, produces a 60 Hz (line frequency) square wave of sufficient amplitude to drive blanking amplifier tube V203. The blanking amplifier switches the leveler amplifier tube V303 from cutoff to conduction by controlling the grid bias. The width of the blanking pulse is adjustable by resistor R202 in the control grid circuit of V201A. This control is normally adjusted for equal on-off time. BLANKING PHASE control potentiometer, R201, adjusts the phase of the blanking pulse in reference to the sweep drive voltage and is adjusted to synchronize ON time of the sweep oscillator with the sweep trace.

3-14. Switching of the blanking circuit is provided by Front Panel FUNCTION switch. In the SWEEP and MOD SWEEP positions, the cathode of blanking generator tube V201A is completed to B-. In the CW and Mod CW positions the blanking generator is made inoperative and the RF oscillator is supplied a steady DC voltage required for CW operation.

3-15. In the MOD SWEEP and MOD CW positions of the Front Panel FUNCTION switch, the cathode of V204A, 1 kHz generator, is grounded, enabling the RF oscillator to be modulated by a 1 kHz square wave. Modulation is accomplished in the same manner as the 60 Hz blanking. Frequency of the 1 kHz generator is adjustable by FREQ ADJ potentiometer R211. Potentiometer R212 is a balance control that is adjusted to balance on-off time of the 1 kHz square wave.

3-16. AUTOMATIC LEVELING CIRCUITRY.

3-17. Leveling of the RF oscillator is accomplished by sampling and detecting the oscillator output in the monitor block. This detected signal is amplified, reversed in phase and applied thru capacitor C801 as the oscillator plate voltage.

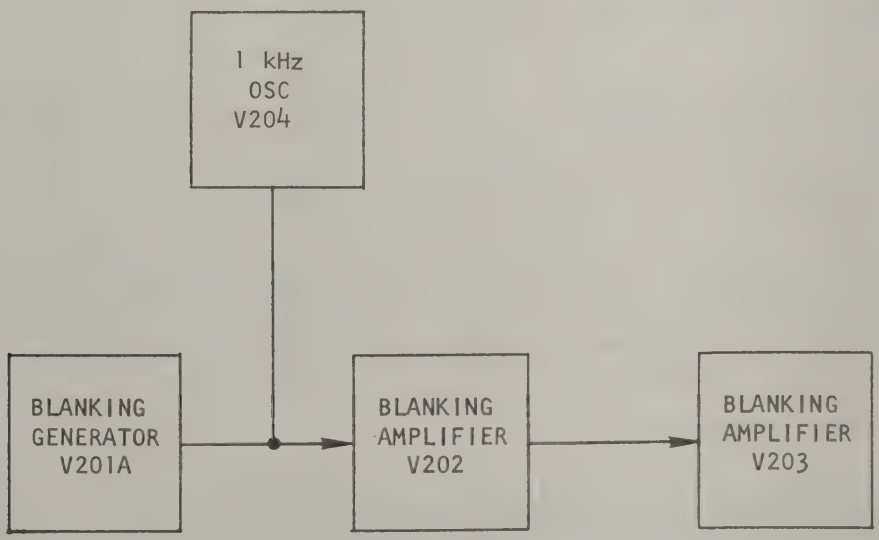


Figure 3-2. Blanking and 1 kHz Oscillator Block Diagram

Therefore, a small change in RF output will result in a large change in the oscillator plate voltage of the opposite phase. This method of leveling provides excellent overall flatness.

3-18. The leveler circuit consists of monitor diode CR5, leveler amplifier tubes V301B, V201B, V302 and V303, oscillator pass tubes V304 and V305, and leveler control amplifier tube V301A. Adjustment of the RF output is accomplished by leveler control amplifier tube V301A. Potentiometers R302 and R303 adjust the maximum output of the Sweep and CW functions respectively. Potentiometer R324 is a Front Panel adjustment used to set output power to the desired level, with the ATTENUATION control set to the OUT position. Potentiometer R325 presets the RF level, with the ATTENUATION control set to the IN position.

CAUTION

Do not attempt to make RF output adjustment before reading the MAINTENANCE Section of this manual as mis-adjustment will result in damage to the RF oscillator tube, monitor block, and the attenuator.

3-19. The Front Panel mounted RF monitor receives an RF input from the sweep oscillator thru input connector J1. This RF input is coupled (1) directly to RF OUT connector J3 (2) thru resistor R4 to the SWEEP SAMPLE connector J4, and (3) thru voltage divider resistors R1 and R2 to detector diode CR5 and the filter network made up of capacitors C1 and C2 and resistor R3. The detector provides an ALC output voltage thru ALC connector J2 to the leveler and meter circuits.

3-20. HORIZONTAL GENERATOR.

3-21. The sawtooth voltage for oscilloscope horizontal sweep is produced by tube V101. A phased 6.3 volt sine wave is applied to the grid of one of the triode sections of V101. The tube then clips and amplifies the grid signal producing a square wave at the plate. This square wave is then shaped by an RC network in the plate circuit to produce a distorted sawtooth voltage. Potentiometer R108 adjusts the linearity of the waveform. The sawtooth voltage is then applied to the second triode section of V101, which is connected as a cathode follower. The output from the cathode follower provides an oscilloscope Horizontal driving waveform which compensates for the slight nonlinear characteristics of the vibrating sweep capacitor at high sweep widths. In order to maintain best linearity for all values of sweep width, potentiometer R110 is ganged with sweep width potentiometer R112 and automatically changes the oscilloscope Horizontal sweep voltage from a sinusoidal waveform at low sweep width settings to a distorted sawtooth waveform at high sweep width settings.

3-22. SWEEP AND CW OSCILLATOR.

3-23. The sweep oscillator is a series fed tuned-plate, tuned-grid oscillator employing a 3CX100A5 VHF triode. Center frequency tuning is inductive and the sweep is accomplished with a wobbulator driven variable capacitor; the variable inductances in the plate and grid circuits are heavy cylindrical conductors spirally wound on an insulating core.

3-24. Each tuning inductance is varied by tapping a continuously variable number of turns. The tap is a grooved wheel, riding on the conductor, which is gear driven up and down the spiral by the frequency dial. The wheel is electrically connected to one end of the coil and shorts out the inactive coil turns. The plate-to-ground and grid-to-ground capacitors are machined aluminum blocks insulated from the chassis by Teflon sheets.

3-25. In the SWEEP and MODULATED SWEEP modes of operation, the plate-to-grid capacitance is varied at line rate by the wobbulator. One plate of the capacitor is a fixed V-shaped notch. The other plate is the wedge-shaped end of a 7/8" cylindrical conductor driven in a plunging action by the wobbulator. The varying distance between the capacitor plates results in a varying capacity, varying resonant frequency, and hence a swept output.

3-26. In order to assure operation at the low end of the frequency range, an adjustable capacitor is connected from plate to cathode. This capacitor is adjusted by means of a set screw protruding from the oscillator compartment.

3-27. The B+ line is decoupled from the output by a 2.2μH RF choke and a 1000pF feed-thru capacitor at the B+ input.

3-28. The ground filament lead is connected through a RF choke to the common connection between the cathode and filament of the 3CX100A5. Another identical RF choke is also in the hot filament lead. A RF by-pass capacitor is connected across the two filament leads between the chokes and the triode.

3-29. The wobbulator drive current is undistorted AC, providing a sine wave sweep. This type of sweep produces a linear frequency presentation and sweep width up to 15% of center frequency. A blanking circuit turns the oscillator off during the retrace half of each cycle in these two modes by removing B+ from the oscillator plate. In the CW modes of operation the 60 cycle blanking circuit and sweep drive circuitry are disabled by the Front Panel Function Switch.

3-30. The output is inductively coupled from the grid and plate tanks through a coupling loop to a low-pass filter which has a cutoff point slightly above the maximum frequency in the range of the unit for harmonic suppression. The filtered signal next enters the Front Panel mounted monitor block. This monitor provides an ALC signal for leveling. The RF oscillator output is coupled directly to Front Panel connector J5 thru the monitor. RF output may be fed through Front Panel ATTEN INPUT connector J703 by jumping RF OUTPUT connector J5 and attenuator INPUT connector J703 and setting the ATTENUATOR OUT-IN switch to the IN position. This switch setting limits RF attenuator input to 4 watts when the FUNCTION control is in SWEEP position and to 2 watts in the CW position. The signal is coupled thru the 3 dB pad in the ATTENUATOR OUT-IN switch to the 0-59 dB attenuator.

3-31. CURRENT LIMITER.

3-32. The current limiter receives a DC reference voltage from the sweep oscillator grid circuit. This input is used to shut off the RF oscillator when grid current reaches 50 mA.

3-33. When the Front Panel FUNCTION switch is in the SWEEP or MOD SWEEP position potentiometer R3 provides biasing for DC amplifier transistor Q1. When the FUNCTION switch is in the CW or MOD CW position, potentiometer R4 provides this biasing.

3-34. The output of transistor Q1 is coupled to DC amplifier transistor Q2. This transistor provides a DC voltage to the leveler circuit to shut off the sweep oscillator at rated 50 mA oscillator grid current.

3-35. MARKER SYSTEM. (Refer to figure 3-3.)

3-36. A sweep sample signal, from the monitor, is coupled to mixer diode CR501 thru connector J501 and resistor R503. An external marker input is coupled to CR501 thru connector J504 and resistor R504. These signals are mixed in CR501 and the resultant, birdy beat note output, is coupled thru resistor R506 and capacitor C501 to the birdy by-pass amplifiers.

3-37. The sweep sample signal from the monitor is also coupled thru resistor R502 and connector J502 to connector P507. Disconnecting P507 from receptacle J507 and connecting a fixed marker between the two will provide a sweep sample to the fixed plug-in markers.

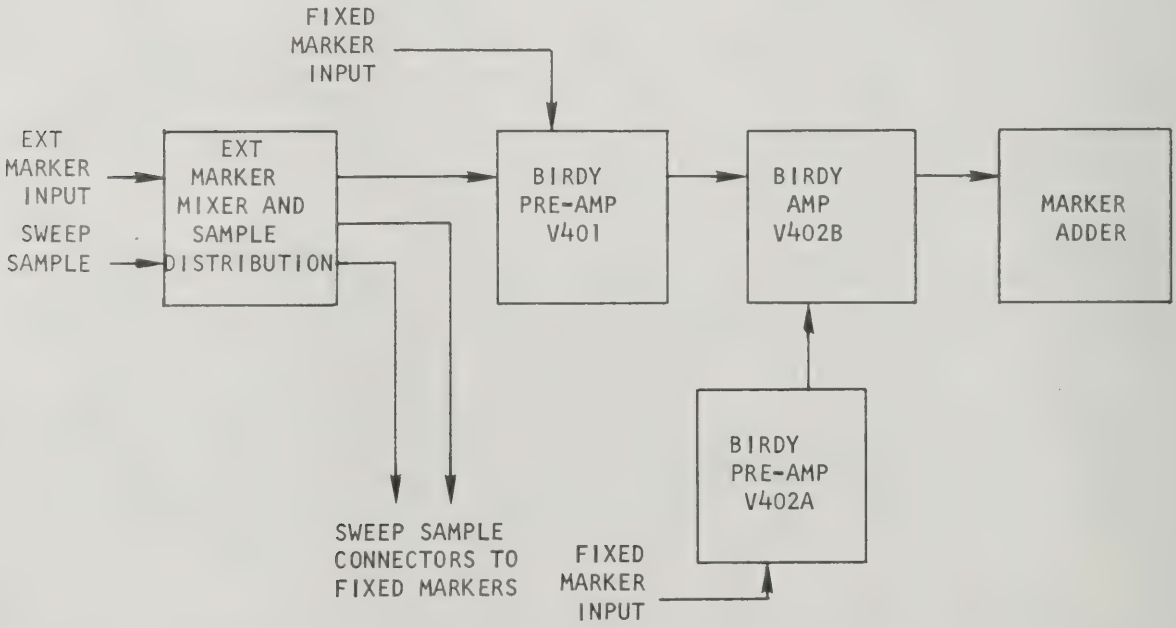


Figure 3-3. Marker System Block Diagram

3-38. In addition, the sweep sample signal from the monitor is coupled thru resistor R501 and connector J503 to connector P506. Disconnecting P506 from receptacle J506 and connecting a fixed marker between the two will also provide a sweep sample to the fixed plug-in markers.

3-39. Three birdy inputs are coupled to the birdy by-pass amplifier thru individual size control fixed marker potentiometers, R404 and R403, and external marker size potentiometer, R401. Front Panel MARKER SIZE control potentiometer, R405, provides a master gain control for birdy markers.

3-40. The output of the birdy by-pass amplifiers is coupled out thru marker adder connectors, J401 and J402.

SECTION IV

MAINTENANCE

4-1. GENERAL.

4-2. This section provides complete information for troubleshooting and maintenance of the PD-7B SWEEP/SIGNAL GENERATOR.

4-3. REQUIRED TEST EQUIPMENT.

4-4. The following test equipment will be required to perform maintenance on the PD-7B.

a. Power Meter-	HP-431B
b. 30 dB Fixed Attenuator-	Microlab AD-30T
c. 3 dB Fixed Attenuator-	Microlab AD-03N
d. Detector-	Telonic XD-23
e. Oscilloscope-	Tektronix 503 or equivalent
f. Volt-Ohm-Milliammeter-	Simpson 260 or equivalent
g. Fixed Plug-in Markers-	Telonic CDH-50, CDH-5
h. External Monitor-	Telonic 8500

4-5. PERFORMANCE CHECK.

4-6. This performance check may be used as a routine maintenance procedure or as an incoming inspection to verify performance of the PD-7B.

CAUTION

Before proceeding with this performance check, ensure that the power transformers are wired for the correct line voltage. The PD-7B high voltage transformers are normally wired for use on 115 volt lines. Following is the line voltage conversion procedure.

4-7. 230 VOLT LINE POWER CONVERSION.

4-8. Because two power transformers are employed, both primaries must be connected before plugging the unit into an AC line source.

4-9. LOW VOLTAGE CONVERSION.

4-10. Refer to figure 4-1. for terminal location and perform the following steps:

a. Remove jumper wire connecting Terminal 24 to Terminal 27.

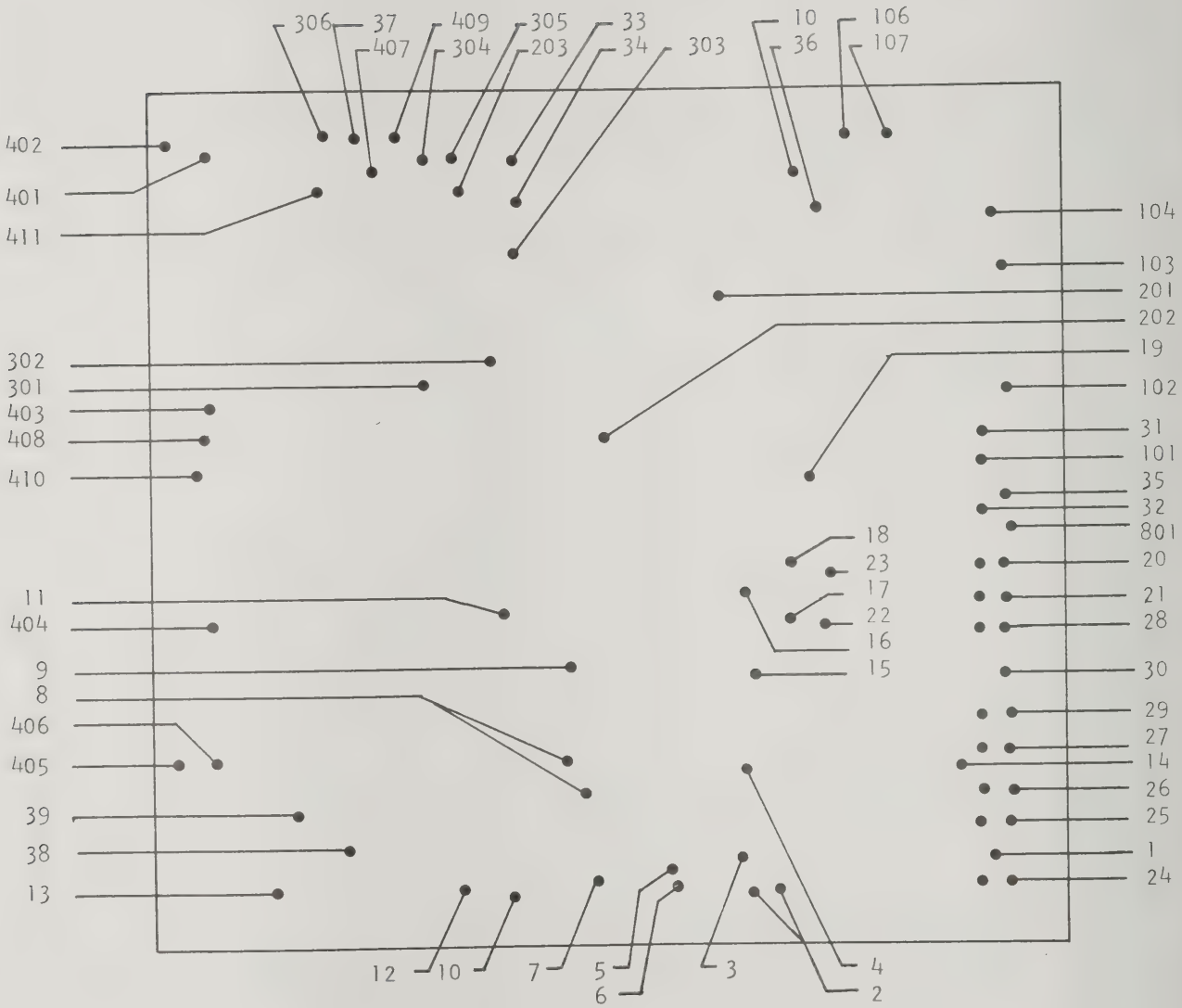


Figure 4-1. Low Voltage Conversion Terminal Location

b. Remove jumper wire connecting Terminal 25 to Terminal 26.

c. Remove 5 amp fuse (F2) and replace with 3 amp slo-blo fuse.

d. Solder a jumper wire from Terminal 26 to Terminal 27.

4-11. HIGH VOLTAGE CONVERSION.

4-12. Refer to figure 4-2. for terminal location and perform the following steps:

a. Remove the jumper wire connecting Terminal 51 to Terminal 52.

b. Remove the jumper wire connecting Terminal 53 to Terminal 54.

c. Remove 2 amp fuse (F1) and replace with 1 amp slo-blo fuse.

d. Solder a jumper wire from Terminal 52 to Terminal 53.

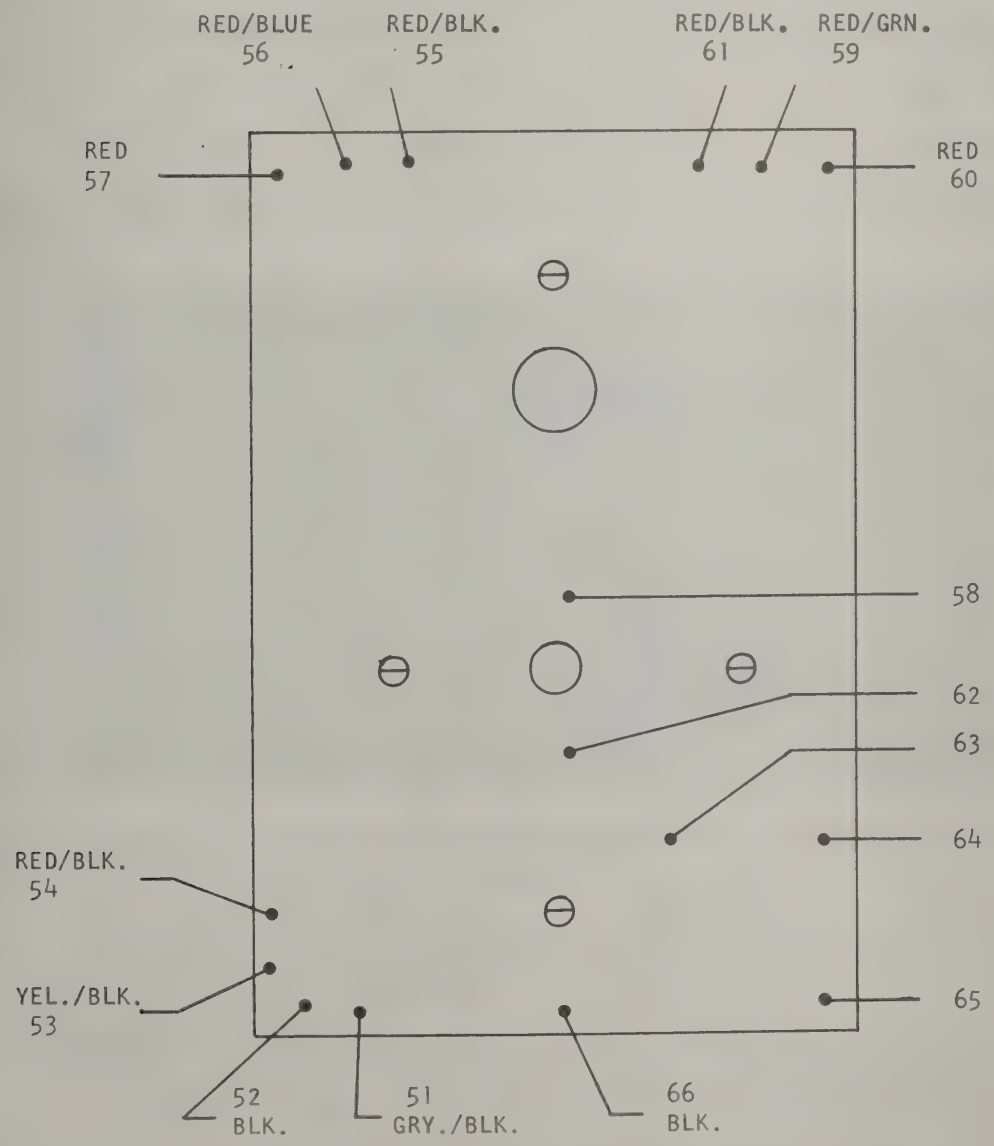


Figure 4-2. High Voltage Conversion Terminal Location

4-13. INITIAL SETUP.

a. Connect the equipment as shown in figure 4-3.

4-14. Set the PD-7B controls to the following positions:

a.	ATTENUATOR OUT-IN-	OUT
b.	FIXED MARKERS, CDH-50 and CDH-5-	ON
c.	MONITOR $\frac{\text{INT}}{\text{EXT}}$ -	INT
d.	LEVEL ADJUST-	fully counterclockwise
e.	SWEEP WIDTH-	fully clockwise
f.	MARKER SIZE-	mid-range
g.	FUNCTION SWITCH-	SWEEP (allow a one hour warmup period)

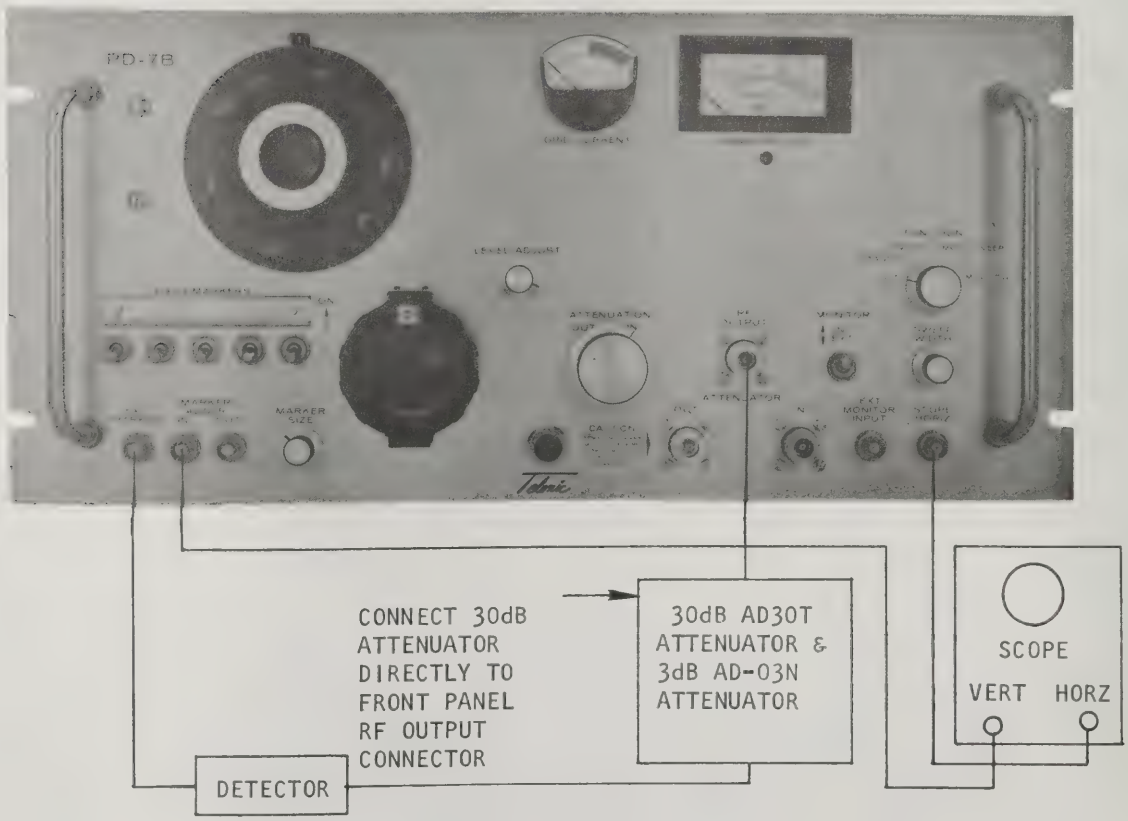


Figure 4-3. Performance Check Test Connections

4-15. SWEEP CENTER FREQUENCY CALIBRATION.

a. Adjust the oscilloscope controls as follows:

(1)	A Input Vertical Gain-	0.1V/cm
(2)	B Input Horizontal Gain-	2V/cm
(3)	A Pre-amp-	+DC
(4)	B Pre-amp-	+DC
(5)	Horizontal Display-	Horizontal amplifier
(6)	Trigger Source-	OFF
(7)	Sweep Mode-	OFF

b. Set the LEVEL ADJUST for approximately 0.5V detected, or 8 watts, as read on POWER OUTPUT METER.

c. Tune Sweep Center Frequency dial to 200 MHz.

d. Decrease SWEEP WIDTH control and observe the 50 and 5 MHz markers on the oscilloscope; frequency indication at minimum sweep width should be 200 MHz ±1%.

e. Repeat step d. for each calibration point on the Sweep Frequency dial for ±1% accuracy.

4-16. SWEEP WIDTH AND LINEARITY CHECK.

a. Set the oscilloscope B Input Horizontal Gain for a 10 cm horizontal display.

b. Tune the Frequency Dial to 200 MHz.

c. Set SWEEP WIDTH control fully clockwise.

d. Observe the sweep width; maximum width should be 20 MHz and may be verified by counting the 5 MHz birdies.

e. Observe the oscilloscope for the narrowest marker interval, refer to figure 4-4., and adjust the oscilloscope B Input Horizontal Gain until this interval is 2 cm wide.

f. Compare the narrowest marker interval in the preceding step; the ratio should be no greater than 1.2:1.

4-17. SWEEP OUTPUT AND FLATNESS CHECK.

a. Set the oscilloscope B Input Horizontal Gain for a 10 cm horizontal display.

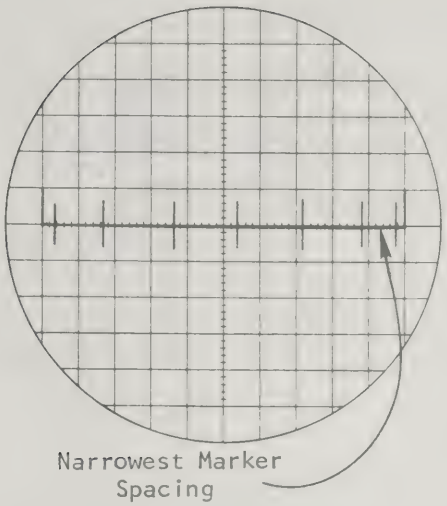


Figure 4-4. Marker Interval Indication

b. Disconnect the external detector from the Front Panel mounted attenuators and connect the HP-431B Power Meter in its place.

c. Set SWEEP WIDTH control fully counterclockwise.

d. Tune the Sweep Frequency dial to 200 MHz.

e. Set the LEVEL ADJUST control for a 2 mW indication on the external power meter and observe the PD-7B POWER OUTPUT METER; this indication should be 8 watts.

f. Tune the PD-7B Frequency dial throughout the entire sweep range and observe the HP-431B Power Meter; total deviation should not exceed 1 dB.

4-18. RF OUTPUT ADJUSTMENT.

4-19. Connect the equipment as shown in figure 4-3.

4-20. Set the PD-7B controls to the following positions:

a. ATTENUATOR OUT-IN-	OUT
b. FIXED MARKERS-	OFF
c. MONITOR $\frac{\text{INT}}{\text{EXT}}$ -	INT
d. LEVEL ADJUST-	fully counterclockwise
e. SWEEP WIDTH-	fully clockwise
f. MARKER SIZE-	fully counterclockwise

g. FUNCTION SWITCH- SWEEP (allow a one hour warmup period)

h. FREQUENCY DIAL- 200 MHz

4-21. Disconnect the external detector from the Front Panel mounted attenuators, connect the HP-431B Power Meter in its place, and make the following adjustments:

CAUTION

The following steps must be performed in the sequence indicated to prevent damage to the equipment.

a. Refer to figure 4-5. for adjustment potentiometer location.

b. Set potentiometer R302 fully counterclockwise.

c. Set Front Panel LEVEL ADJUST control fully clockwise.

d. Set potentiometer R302 for an indication of 10 mW on the HP-431B Power Meter. (This 10 mW reading corresponds to 40 watts peak power at the PD-7B RF OUTPUT connector.)

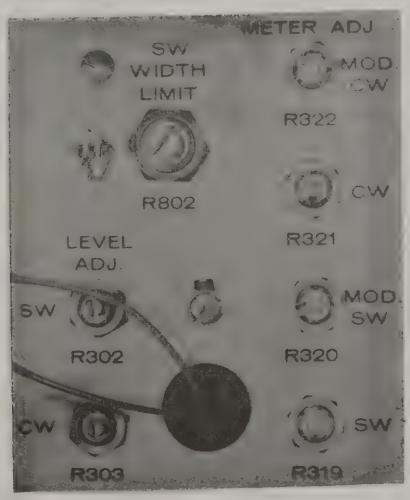


Figure 4-5. Adjustment Location

e. Adjust Rear Panel LEVEL ADJ potentiometer, R325, fully counterclockwise.

f. Set ATTENUATOR OUT-IN control to the IN position.

g. Observe the external power meter and adjust R325 for an indication of 1 mW. (This 1 mW reading corresponds to 4 watts peak power at the PD-7B RF OUTPUT connector.)

h. Set the Front Panel FUNCTION switch to the CW position.

i. Adjust potentiometer R303 for an indication of 1 mW on the external power meter. (This 1 mW reading corresponds to 2 watts peak power at the PD-7B RF OUTPUT connector.)

4-22. CURRENT LIMIT CHECK.

a. Set the PD-7B controls as specified in paragraph 4-20.

b. Set the LEVEL ADJUST control fully clockwise.

c. Tune the Frequency dial throughout the entire sweep range; grid current indicated on Front Panel GRID CURRENT METER, should not exceed safe operating range at any point.

d. Set LEVEL ADJUST control fully counterclockwise.

e. Set the Front Panel FUNCTION switch to the CW position.

f. Set the LEVEL ADJUST control for an indication of 20 watts on the PD-7B Front Panel POWER OUTPUT meter.

g. Tune the Frequency dial throughout the entire sweep range; grid current, indicated on Front Panel GRID CURRENT METER, should not exceed safe operating range at any point.

4-23. TROUBLESHOOTING.

4-24. Refer to table 4-1. for troubleshooting procedures.

TABLE 4-1.

Troubleshooting Chart				
Proc. No.	Trouble	Normal Indication	Test Point	Probable Cause of Failure
1.	Improper high voltage supply output	+1000 VDC	Terminal 62	1. Fuse F1 2. Rectifiers CR51 and CR52 3. Inductor L51 and filter capacitor C53 4. Time delay relay DR51
2.	Improper B+3 (low voltage output B+2 normal)	B+3 100 V	Terminal 13	1. Pass tube V5 and associated circuitry
3.	Improper B+2 and B+3 low voltage output	B+2 +175V B+3 +100V	Terminal 12 Terminal 13	1. Rectifier diodes CR1, CR2, and associated circuitry 2. Filter and doubler capacitors C1, C2, C3, and C8 3. Pass tube V4 and associated circuitry
4.	All low voltage is of improper value	B+2 175V B+3 100V B- 85V B- 150V	Terminal 12 Terminal 13 Terminal 11 Terminal 16	1. Rectifier diodes CR3 and CR4 and associated circuitry 2. Voltage regulator tubes V1 and V2 3. Power Transformer T1
5.	Improper RF level output	8 watts minimum	RF output connector	1. Oscillator tube V801 2. Fuse F1 3. Rectifiers CR51 and CR52 4. Inductor L51 and filter capacitor C53 5. Time delay relay DR51

TABLE 4-1. (Cont)

Proc. No.	Trouble	Normal Indication	Test Point	Probable Cause of Failure
6.	Improper sweep width	0.02 to 10% of center frequency	RF output connector	1. Potentiometer R802 2. Capacitors C302 and C303
7.	Improper square wave modulation	1 kHz square wave modulation	RF output connector	1. 1 kHz oscillator tube V204 2. Function switch S201B
8.	Improper leveling	Flatness ±0.5 dB over full range (at 8 watts output)	RF output connector	1. Leveler amplifier tubes V301, and V201B and associated circuitry 2. Monitor diode CR5 and associated circuitry

SECTION V

PARTS LIST AND SCHEMATIC DIAGRAMS

5-1. GENERAL.

5-2. This section provides the complete electrical parts list and a complete set of schematic diagrams required for maintenance of the PD-7B.

5-3. ABBREVIATION CODE.

5-4. Table 5-1. specifies the abbreviations used for components in the PD-7B electrical parts list.

TABLE 5-1.

Abbreviation Code	
CFCF	Capacitor, Fixed, Ceramic, Feed-thru
CFD	Capacitor, Fixed, Discap
CFE	Capacitor, Fixed, Electrolytic
CFM	Capacitor, Fixed, Mica
CFP	Capacitor, Fixed, Paper
CFT	Capacitor, Fixed, Teflon
CVA	Capacitor, Variable, Air
DS	Diode, Semiconductor
DSZ	Diode, Semiconductor, Zener
IF	Inductor, Fixed
IV	Inductor, Variable
P.O.	Part of
RFC	Resistor, Fixed, Composition
RFCF	Resistor, Fixed, Carbon Film
RFMF	Resistor, Fixed, Metal Film
RFWW	Resistor, Fixed, Wirewound
RVC	Resistor, Variable, Composition
RVDWW	Resistor, Variable, Dual, Wirewound, Composition
RVWW	Resistor, Variable, Wirewound
SWT	Switch, Toggle
TE	Tube, Electron
TP	Transformer, Power
TR	Transistor

5-5. ELECTRICAL PARTS LIST.

5-6. Tables 5-2. thru 5-6. provide the complete electrical parts list for each schematic of the PD-7B.

5-7. SCHEMATIC DIAGRAMS.

5-8. The following schematics are included in this manual:

a. Power Supply Figure 5-1

b. PD-7B Control Circuitry Figure 5-2

c. PD-7B Sweeper Figure 5-3

d. Monitor Figure 5-4

e. Current Limiter Figure 5-5

5-9. All resistors are shown in ohms unless otherwise specified.

5-10. All capacitors are shown in picofarads (pF) unless otherwise specified.

5-11. All coils are shown in microhenries (μH) unless otherwise specified.

TABLE 5-2.

Electrical Parts List

Power Supply

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
B1	Blower, 115V	Howard Industries	3-90-8505	36-0027-01
C1	CFE, 0.22μF, 400VDCW	Cornell Dubilier	Type M-B	22-0102-01
C2A	CFE, 80μF, 450VDCW	Sprague	TVL3793	20-0021-01
2B	40μF			
2C	20μF			
C3	CFE, 80μF, 250VDCW	Pyramid Elect	ATM	20-0011-03
C4	CFE, 30μF, 250VDCW	Sangamo	MT 2530	20-0010-01
C5	CFE, 10μF, 450VDCW	Sprague	TVA-1705	20-0020-01
C6	CFE, 30μF, 150VDCW	Sangamo	MT 4530	20-0005-03
C7	CFM, 0.1μF, 600VDCW	Electro Motive	DP-4-104	22-0012-01
C8	Same as C1			
C9	CFE, 30μF, 150VDCW	Sangamo	MT 1530	20-0005-02
C53	CFE, 50μF, 25VDCW	Sprague Elect	TVA 1206	20-0001-01
C54	CFE, 80μF, 450VDCW	Pyramid Elect	TMS 60	20-0012-01
C55	Same as C7			
C56	Same as C7			
CR1	DS, 1N2094	P.R. Mallory	1N2094	41-0006-01
CR2	Same as CR1			
CR3	Same as CR1			
CR4	Same as CR1			
CR51	DS, D1530LS	Diodes Inc.	D1530LS	41-0043-01
CR52	Same as CR51			
DR51	Delay Relay	Amperite Co.	6N060T	37-0019-01
F1	Fuse, 3AG, 2 Amp	Little Fuse	312002	36-0016-01
F2	Fuse, 3AG, 5 Amp	Little Fuse	312005	36-0016-07
L51	IF, 7H	Stancor	C171064C055	32-0009-01
R1	RFC, 4.7Ω, ±10%, 1W	Allen-Bradley	GB4701	28-0007-01
R2	RFWW, 6kΩ, ±5%, 10W	Sprague Elect	247E6025	28-0105-13
R3	RFC, 1.5kΩ, ±10%, 2W	Allen-Bradley	HB1525	28-0065-01
R4	RFC, 15kΩ, ±10%, 1W	Allen-Bradley	GB1531	28-0003-01
R5	RFC, 1.5MΩ, ±10%, 1/2W	Allen-Bradley	EB1551	26-0032-01
R6	RFC, 10MΩ, ±10%, 1/2W	Allen-Bradley	EB1061	26-0047-01
R7	Same as R6			
R8	RFC, 1kΩ, ±10%, 1/2W	Allen-Bradley	EB1021	26-0018-01
R9	RFC, 100kΩ, ±10%, 2W	Allen-Bradley	HB1041	28-0048-01
R10	RFC, 47kΩ, ±10%, 2W	Allen-Bradley	HB4731	28-0050-01
R11	RFC, 1MΩ, ±10%, 1/2W	Allen-Bradley	EB1051	26-0031-01

TABLE 5-2. (Cont)

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
R12	RFC, 100Ω, ±10%, 1/2W	Allen-Bradley	EB1011	26-0015-01
R13	Same as R12			
R14	RFC, 22Ω, ±10%, 1/2W	Allen-Bradley	EB2201	26-0011-01
R15	RFC, 2.7kΩ, ±10%, 2W	Allen-Bradley	HB2731	28-0049-01
R16	RFC, 180kΩ, ±10%, 1/2W	Allen-Bradley	EB1841	26-0045-01
R17	RVC, 50kΩ, 2/10W	CTS	Type UPE-70	29-0015-02
R18	RFC, 82kΩ, ±5%, 1/2W	Allen-Bradley	EB8235	26-0100-01
R19	Same as R12			
R20	Same as R12			
R21	RFC, 220kΩ, ±10%, 1/2W	Allen-Bradley	EB2241	26-0044-01
R22	Same as R21			
R23	Same as R21			
R51	RFC, 33Ω, ±10%, 1/2W	Allen-Bradley	EB3301	26-0012-01
R52	Same as R51			
R53	RFC, 390kΩ, ±10%, 2W	Allen-Bradley	HB3941	28-0066-01
R54	Same as R53			
R55	Same as R53			
R56	RFWW, 200Ω, ±5%, 5W	Sprague Elect	243E2015	28-0085-01
R57	RFWW, 15kΩ, ±5%, 10W	Sprague Elect	247E1535	28-0105-03
R58	Same as R57			
S201	Switch Assy	CTS Corp.	212-8012-3-2AC	37-0018-01
T1	TP, 115/230 VAC	Triad Transformer	68137	34-0016-01
T51	TP, 115/230 VAC	Triad Transformer	68147	34-0015-01
V1	TE, 0A2	Sylvania	0A2	42-0019-01
V2	TE, 5651	Sylvania	5651	42-0015-01
V3	TE, 6AU6	Sylvania	6AU6	42-0004-01
V4	TE, E484	International Mullard	E484	42-0014-01
V5	Same as V4			

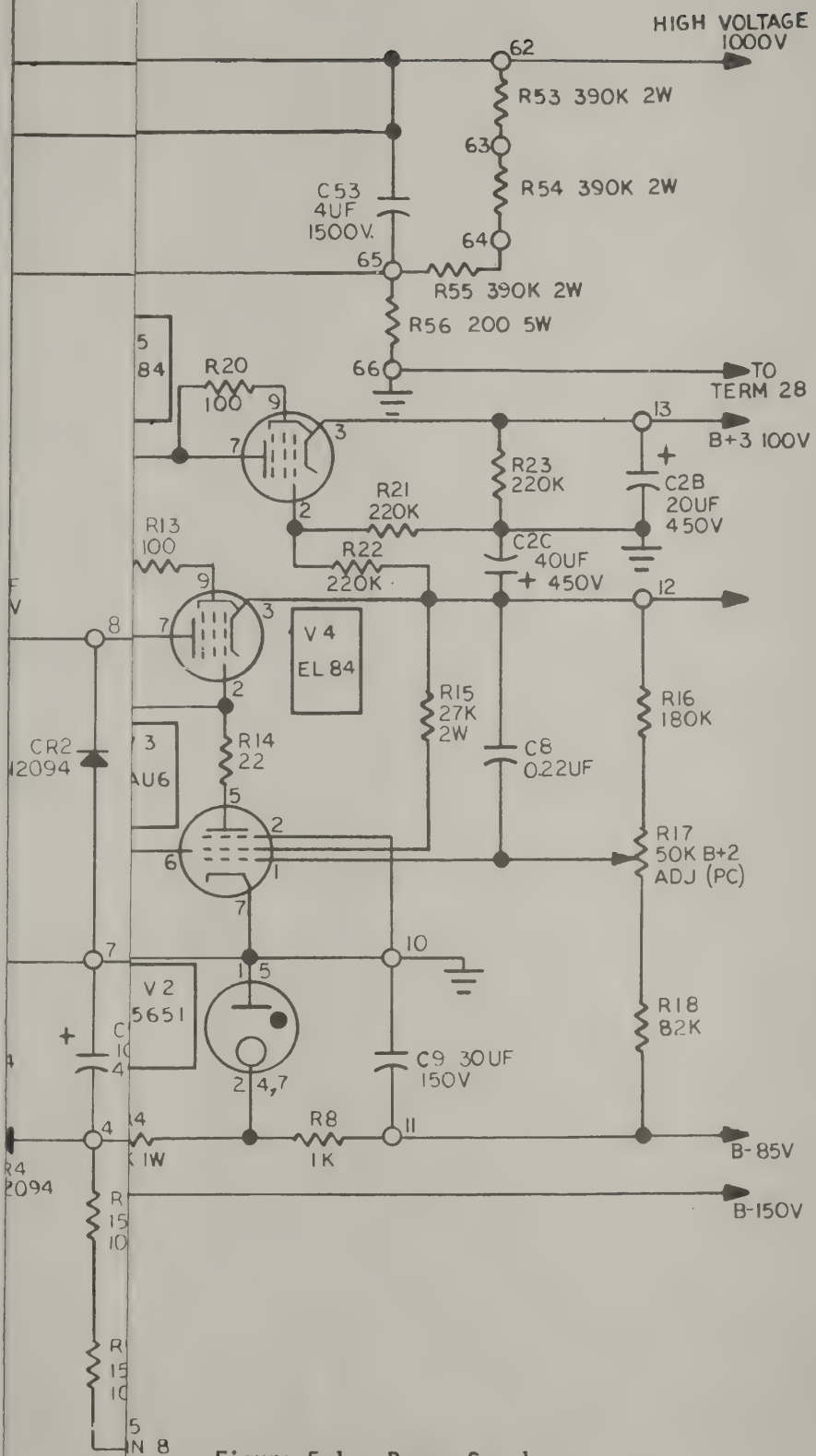


Figure 5-1. Power Supply

TABLE 5-2. (Cont)

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
R12	RFC, 100Ω, ±10%, 1/2W	Allen-Bradley	EB1011	26-0015-01
R13	Same as R12			
R14	RFC, 22Ω, ±10%, 1/2W	Allen-Bradley	EB2201	26-0011-01
R15	RFC, 2.7kΩ, ±10%, 2W	Allen-Bradley	HB2731	28-0049-01
R16	RFC, 180kΩ, ±10%, 1/2W	Allen-Bradley	EB1841	26-0045-01
R17	RVC, 50kΩ, 2/10W	CTS	Type UPE-70	29-0015-02
R18	RFC, 82kΩ, ±5%, 1/2W	Allen-Bradley	EB8235	26-0100-01
R19	Same as R12			
R20	Same as R12			
R21	RFC, 220kΩ, ±10%, 1/2W	Allen-Bradley	EB2241	26-0044-01
R22	Same as R21			
R23	Same as R21			
R51	RFC, 33Ω, ±10%, 1/2W	Allen-Bradley	EB3301	26-0012-01
R52	Same as R51			
R53	RFC, 390kΩ, ±10%, 2W	Allen-Bradley	HB3941	28-0066-01
R54	Same as R53			
R55	Same as R53			
R56	RFWW, 200Ω, ±5%, 5W	Sprague Elect	243E2015	28-0085-01
R57	RFWW, 15kΩ, ±5%, 10W	Sprague Elect	247E1535	28-0105-03
R58	Same as R57			
S201	Switch Assy	CTS Corp.	212-8012-3-2AC	37-0018-01
T1	TP, 115/230 VAC	Triad Transformer	68137	34-0016-01
T51	TP, 115/230 VAC	Triad Transformer	68147	34-0015-01
V1	TE, 0A2	Sylvania	0A2	42-0019-01
V2	TE, 5651	Sylvania	5651	42-0015-01
V3	TE, 6AU6	Sylvania	6AU6	42-0004-01
V4	TE, E484	International Mullard	E484	42-0014-01
V5	Same as V4			

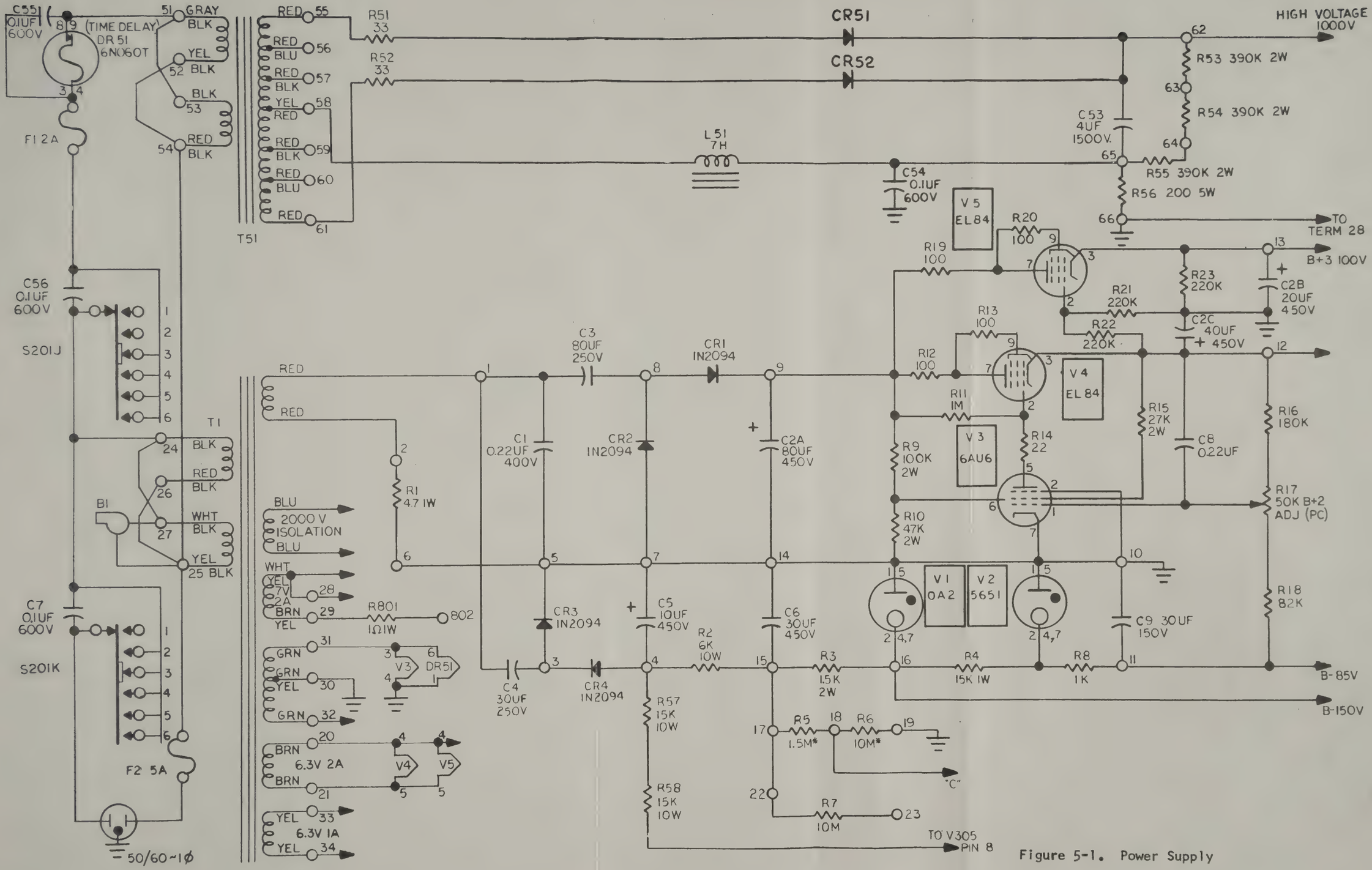


Figure 5-1. Power Supply

TABLE 5-3.

Electrical Parts List

PD-7B Control Circuit

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
C101	CFP, 0.1μF, 200VDCW	Cornell-Dubilier	BC2-P1	22-0093-01
C102	Same as C101			
C103	Same as C101			
C104	CFP, 0.001μF, 600VDCW	Cornell-Dubilier	BC6-D1	22-0099-01
C105	CFM, 0.01μF, 500VDCW	Electro Motive	DM-30-103J	22-0041-01
C106	CFP, 0.22μF, 400VDCW	Standard Condenser	Type M-B	22-0102-01
C107-C111	Not Assigned			
C112	CFM, 2500pF, 600VDCW	Electro Motive	DM20-252	22-0021-01
C201	Same as C101			
C202	Same as C101			
C203	Same as C101			
C204	CFM, 0.1μF, 600VDCW	Electro Motive	DP4-104	22-0012-01
C205	CFE, 1μF, 450VDCW	Sprague	TVA1700	20-0001-02
C206	CFM, 1000pF, 500VDCW	Electro Motive	DM19-102	22-0008-04
C207	Same as C206			
C301	CFD, 150pF, 1000VDCW	RMC	Type C	22-0003-03
C302	CFE, 440μF, 12VDCW	Sprague	NLW400-12	20-0016-02
C303	CFE, 200μF, 12VDCW	Sprague	NLW200-12	20-0016-02
C401	CFD, 0.01μF, 500VDCW	RMC	Type SM	22-0006-01
C402	Same as C401			
C403	Same as C401			
C404	CFD, 120pF, 1000VDCW	RMC	Type C	22-0002-03
C405	Same as C404			
CR101	DS, 1N2094	P.R. Mallory	1N2094	41-0006-01
CR201	Same as CR101			
CR301	Same as CR101			
CR302	DS, 1N34AS	Sylvania	1N34AS	41-0008-01
I1	Lamp, Indicator	GE	#47	36-0015-01
J101	Receptacle, Elect	Dage	2545-1	44-0010-01
J301	Same as J101			
J401	Same as J101			
J402	Same as J101			

TABLE 5-3. (Cont)

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
L401	IF, 10mH	Wilco Corp	3810	32-0007-01
L402	Same as L401			
M1	Meter, Panel, 100μA	Simpson Elect	100μA	36-0022-01
R101	RVC, 200kΩ, 2/10W	CTS	Type UPE	29-0015-01
R102	RFC, 18kΩ, ±10%, 1/2W	Allen-Bradley	EB1831	26-0046-01
R103	RFC, 330kΩ, ±10%, 1/2W	Allen-Bradley	EB3341	26-0094-01
R104	RFC, 100kΩ, ±10%, 1/2W	Allen-Bradley	EB1041	26-0028-01
R105	RFC, 220kΩ, ±10%, 1/2W	Allen-Bradley	EB2241	26-0044-01
R106	RFC, 1MΩ, ±10%, 1/2W	Allen-Bradley	EB1051	26-0031-01
R107	Same as R105			
R108	RVC, 2MΩ, 2/10W	CTS	Type UPE	29-0015-05
R109	RVC, 100kΩ, 2/10W	CTS	Type UPE	29-0015-07
R110	RVDWW, 6Ω, 3W, 100kΩ 1/3W, (P.O. R330)	CTS	2WQ2G	29-0018-02
R111	Same as R105			
R201	Same as R101			
R202	RVC, 1MΩ, 2/10W	CTS	Type UPE	29-0015-04
R203	Same as R105			
R204	Same as R104			
R205	Same as R104			
R206	RFC, 560kΩ, ±10%, 1/2W	Allen-Bradley	EB5641	26-0029-01
R207	RFC, 47kΩ, ±10%, 1/2W	Allen-Bradley	EB4731	26-0027-01
R208	RFC, 10kΩ, ±10%, 1/2W	Allen-Bradley	EB1031	26-0023-01
R209	Same as R104			
R210	Same as R105			
R211	Same as R202			
R212	RVC, 500kΩ, 2/10W	CTS	Type UPE	29-0015-08
R213	Same as R105			
R214	Same as R104			
R215	Not assigned			
R216	Same as R206			
R217	RFC, 3.3kΩ, ±10%, 1/2W	Allen-Bradley	EB3321	26-0070-01
R301	RFC, 150kΩ, ±10%, 1/2W	Allen-Bradley	EB1541	26-0098-01
R302	RVC, 50kΩ, 2/10W	CTS	Type 70	29-0022-01
R303	Same as R302			
R304	RFC, 3.3MΩ, ±10%, 1/2W	Allen-Bradley	EB3351	26-0049-01
R305	RVC, 25kΩ, 2/10W	CTS	Type 70	29-0003-04
R306	RFC, 27kΩ, ±10%, 1/2W	Allen-Bradley	EB2731	26-0025-01
R307	RFC, 56kΩ, ±10%, 1/2W	Allen-Bradley	EB5631	26-0071-01
R308	Same as R106			
R309	Same as R105			
R310	Same as R104			
R311	Same as R307			
R312	Same as R207			

TABLE 5-3. (Cont)

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
R313	RFC, 1000Ω, ±10%, 1/2W	Allen-Bradley	EB1021	26-0015-01
R314	RFC, 47Ω, ±10%, 1W	Allen-Bradley	GB4701	28-0001-01
R315	RFC, 10kΩ, ±10%, 1/2W	Allen-Bradley	EB1031	26-0023-01
R316	Same as R313			
R317	Same as R314			
R318	Not assigned			
R319	Same as R302			
R320	Same as R302			
R321	Same as R302			
R322	Same as R302			
R323	RFC, 4.7kΩ, ±10%, 1/2W	Allen-Bradley	EB4721	26-0021-01
R324	RVC, 100kΩ, 1/3W	CTS	Type 45	29-0001-03
R325	RVC, 250kΩ, 2W	Ohmite	CLU2541	29-0025-02
R326	RFC, 12kΩ, ±10%, 1/2W	Allen-Bradley	EB1231	26-0119-01
R327	RFC, 22Ω, ±10%, 1W	Allen-Bradley	GB2201	28-0022-01
R328	RFWW, 4Ω, ±5%, 5W	Sprague	0405	28-0087-01
R329	RVWW, 25Ω, 2W	CTS	Type 252	29-0004-01
R330	P.O. R110			
R401	RVC, 10kΩ, 3/10W	CTS	Type UPE	29-0015-01
R402	RFC, 68kΩ, ±10%, 1/2W	Allen-Bradley	EB6831	26-0051-01
R403	Same as R401			
R404	Same as R401			
R405	RVDWW, 100kΩ, 1/3W	Telonic		29-0020-02
R406	RFC, 470Ω, ±10%, 1/2W	Allen-Bradley	EB4711	26-0042-01
R407	Same as R207			
R408	Same as R207			
S201	Switch Rotary	CTS	212-2-45	37-0018-01
S301	SWT, DPDT	Cutler-Hammer	CH8363K7	37-0002-01
S302	Switch Rotary	Telonic		97-7522-01
S501	SWT, SPST	Cutler-Hammer	CH8280K6	37-0005-01
S502	Same as S501			
S503	Same as S501			
S504	Same as S501			
S505	Same as S501			
V101	TE, 12AX7	RCA	12AX7	42-0012-01
V201	Same as V101			
V202	TE, 6C4	RCA	6C4	42-0026-01
V203	TE, 6842	RCA	6842	42-0027-01
V204	TE, 12AV7	RCA	12AV7	42-0011-01
V301	Same as V101			
V302	TE, 7235	RCA	7235	42-0028-01
V303	Same as V302			

Circuit Ref	Des
V304	TE, EL3
V305	Same as
V401	Same as
V402	Same as
Z501	Tube, S
Z502	Same as
Z503	Same as
Z504	Same as
Z505	Same as

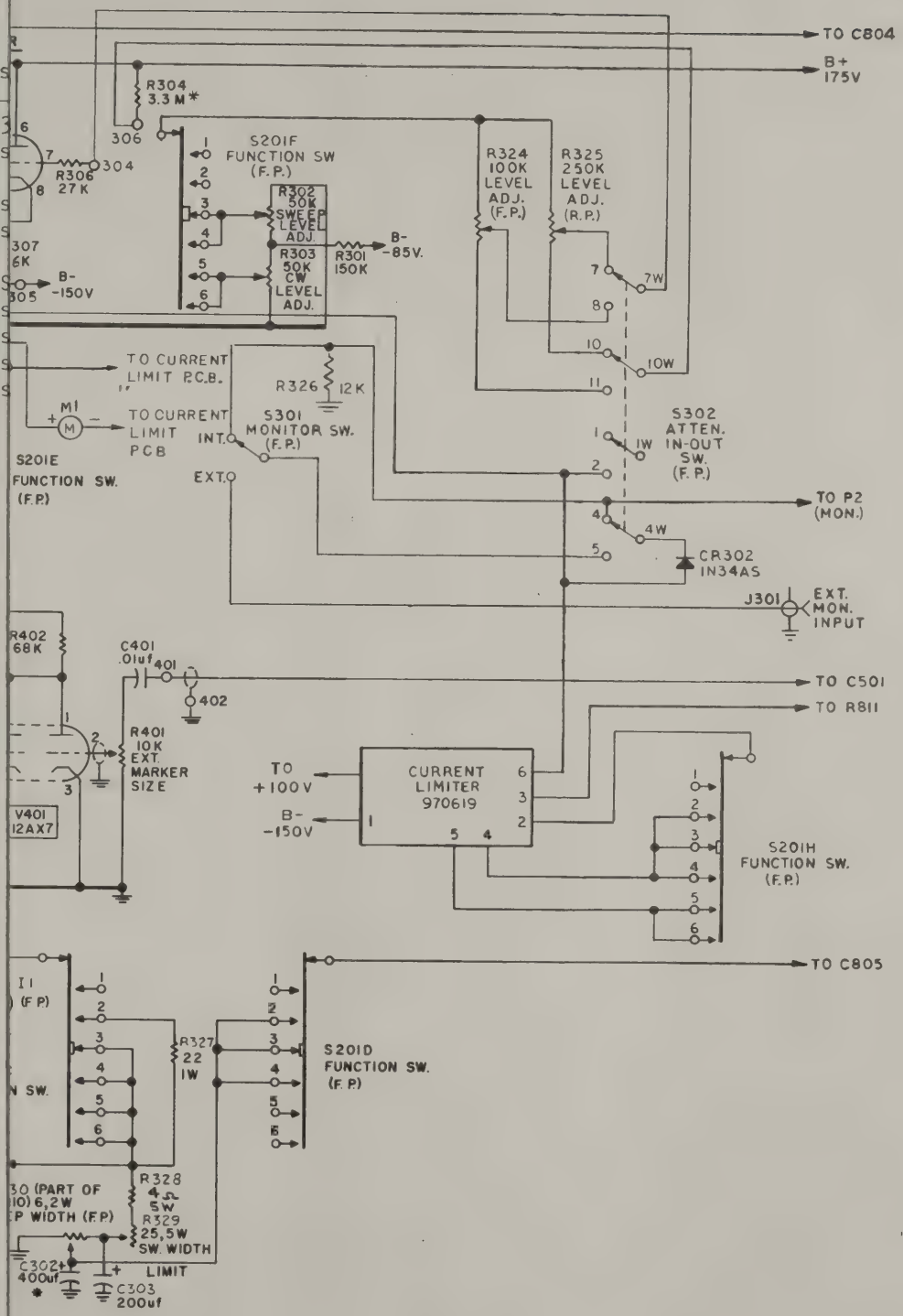


Figure 5-2. PD-7B Control Circuitry

TABLE 5-3. (Cont)

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
R313	RFC, 1000Ω, ±10%, 1/2W	Allen-Bradley	EB1021	26-0015-01
R314	RFC, 47Ω, ±10%, 1W	Allen-Bradley	GB4701	28-0001-01
R315	RFC, 10kΩ, ±10%, 1/2W	Allen-Bradley	EB1031	26-0023-01
R316	Same as R313			
R317	Same as R314			
R318	Not assigned			
R319	Same as R302			
R320	Same as R302			
R321	Same as R302			
R322	Same as R302			
R323	RFC, 4.7kΩ, ±10%, 1/2W	Allen-Bradley	EB4721	26-0021-01
R324	RVC, 100kΩ, 1/3W	CTS	Type 45	29-0001-03
R325	RVC, 250kΩ, 2W	Ohmite	CLU2541	29-0025-02
R326	RFC, 12kΩ, ±10%, 1/2W	Allen-Bradley	EB1231	26-0119-01
R327	RFC, 22Ω, ±10%, 1W	Allen-Bradley	GB2201	28-0022-01
R328	RFWW, 4Ω, ±5%, 5W	Sprague	0405	28-0087-01
R329	RVWW, 25Ω, 2W	CTS	Type 252	29-0004-01
R330	P.O. R110			
R401	RVC, 10kΩ, 3/10W	CTS	Type UPE	29-0015-01
R402	RFC, 68kΩ, ±10%, 1/2W	Allen-Bradley	EB6831	26-0051-01
R403	Same as R401			
R404	Same as R401			
R405	RVDWW, 100kΩ, 1/3W	Telonic		29-0020-02
R406	RFC, 470Ω, ±10%, 1/2W	Allen-Bradley	EB4711	26-0042-01
R407	Same as R207			
R408	Same as R207			
S201	Switch Rotary	CTS	212-2-45	37-0018-01
S301	SWT, DPDT	Cutler-Hammer	CH8363K7	37-0002-01
S302	Switch Rotary	Telonic		97-7522-01
S501	SWT, SPST	Cutler-Hammer	CH8280K6	37-0005-01
S502	Same as S501			
S503	Same as S501			
S504	Same as S501			
S505	Same as S501			
V101	TE, 12AX7	RCA	12AX7	42-0012-01
V201	Same as V101			
V202	TE, 6C4	RCA	6C4	42-0026-01
V203	TE, 6842	RCA	6842	42-0027-01
V204	TE, 12AV7	RCA	12AV7	42-0011-01
V301	Same as V101			
V302	TE, 7235	RCA	7235	42-0028-01
V303	Same as V302			

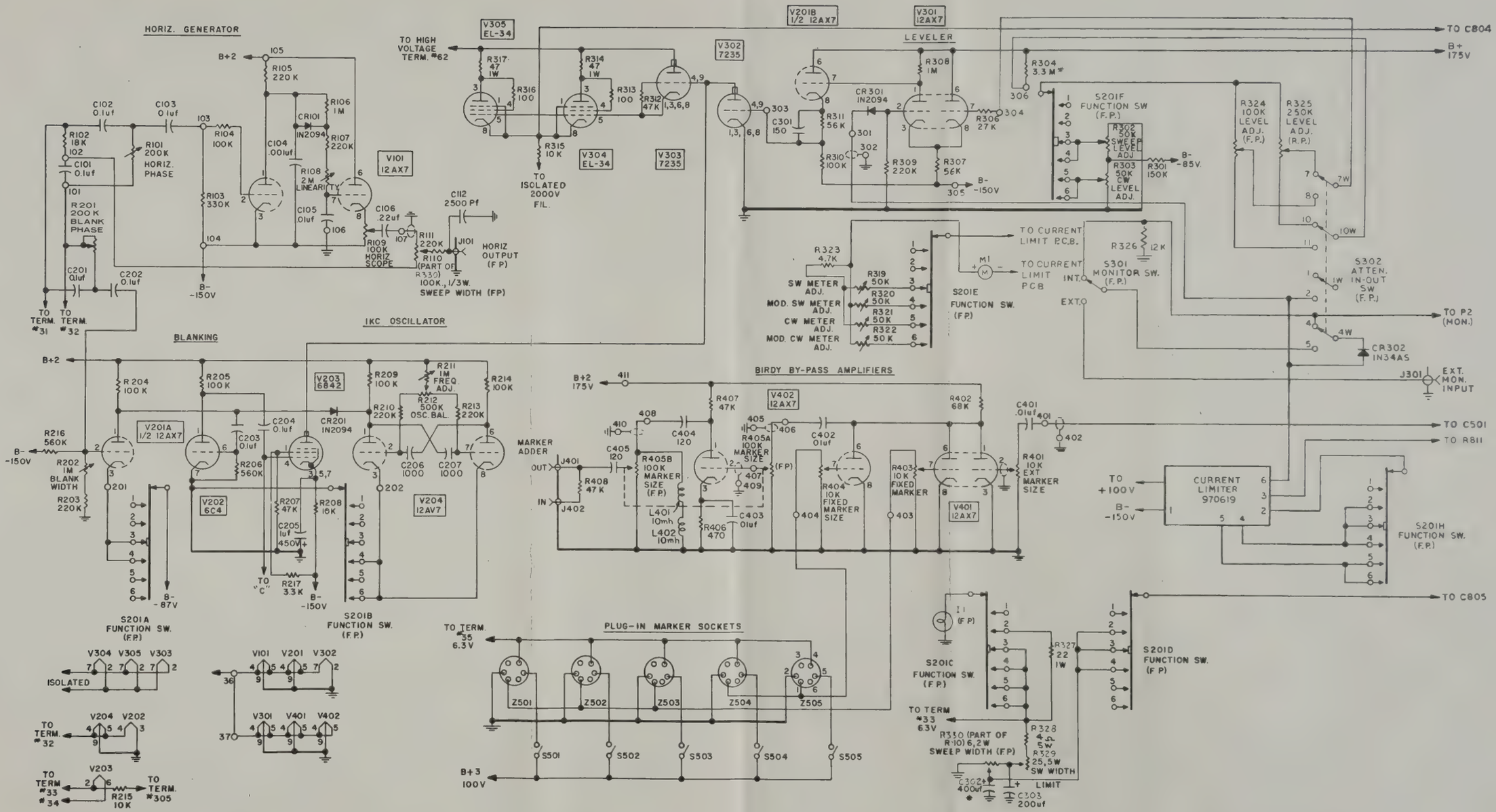


Figure 5-2. PD-7B Control Circuitry

TABLE 5-4.

Electrical Parts List

Sweeper

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
C501	CFCF, 1000pF, 1000VDCW	Erie Resistor Corp	102PZ5V0	21-0004-01
C801	Not assigned			
C802	Not assigned			
C803	CFT, 3pF, P.O. Assy No. 975067	Telonic		NA
C804	CFCF, 1000pF, 500VDCW	Aerovox Corp	BSS-1BB	21-0013-01
C805	Same as C804			
C806	Same as C804			
C807	Same as C804			
C808	CFT, 10pF, P.O. Assy No. 975067	Telonic		NA
C809	CVA, 0.1-5pF, P.O. Assy No. 975067	Telonic		NA
C810	Same as C808			
C811	CVA, 0.01-1pF, P.O. Assy No. 975067	Telonic		NA
C812	Same as C805			
C813	CVA, 0.5-2pF, P.O. Assy No. 975067	Telonic		NA
CR501	DS, 1N82AL	Sylvania Elect	1N82AL	41-0001-01
J501	Receptacle, Elect	Dage Electric	MX 1684/W	44-0009-01
J502	Same as J501			
J503	Same as J501			
J504	Receptacle, Elect	Dage Electric	2559-1	44-0011-01
J505	Same as J501			
J506	Receptacle, Elect	Telonic		44-0020-01
J507	Same as J506			
J701	Receptacle, Elect	Star-Tronics	5284-1	44-0082-01
J702	Receptacle, Elect	Dage Electric	8107-1	44-0038-01
J703	Receptacle, Elect	Dage Electric	30150-1	44-0203-01
J704	Same as J703			
J805	Receptacle, Elect	Dage Electric	816-1	44-0054-01
L801	IF, 10μH, P.O. Assy No. 975067	Telonic		NA
L802	Same as L801			
L803	IV, 0.02-1.2μH, Front Tuning	Telonic		33-0013-01
L804	IV, 0.02-1.2μH, Rear Tuning	Telonic		33-0012-01

Circuit Ref	Descri
L805	IF, 0.5µH,
	P.O. Assy N
L806	IF, 2.2µH
M2	Meter 0-100
P1	Plug, Elect
P2	Plug, Cable
P3	Not assigne
P4	Plug, Elect
P506	Same as P4
P507	Same as P4
P701	Same as P1
P702	Same as P1
P703	Not assigne
P704	Not assigne
P705	Same as P4
P706	Same as P4
P805	Same as P4
R501	RFC, 120Ω,
R502	Same as R503
R503	RFC, 470Ω,
R504	RFC, 56Ω, ±
R505	Same as R50
R506	RFC, 220Ω,
R701	RFCF, 292Ω,
R702	RFC, 17.6Ω,
R703	RFCF, 866Ω,
R704	Same as R70
R705	Same as R70
R801	RFC, 1Ω, ±1
R802-R810	Not assigne
R811	RFWW, 500Ω,
R812	Not assigne
R813	RFC, 200Ω,
R814	RFC, 47Ω, ±
S201	Switch, Ass
V801	TE, 3CX100A
Z801	Wobbulator
Z802	Filter Asse

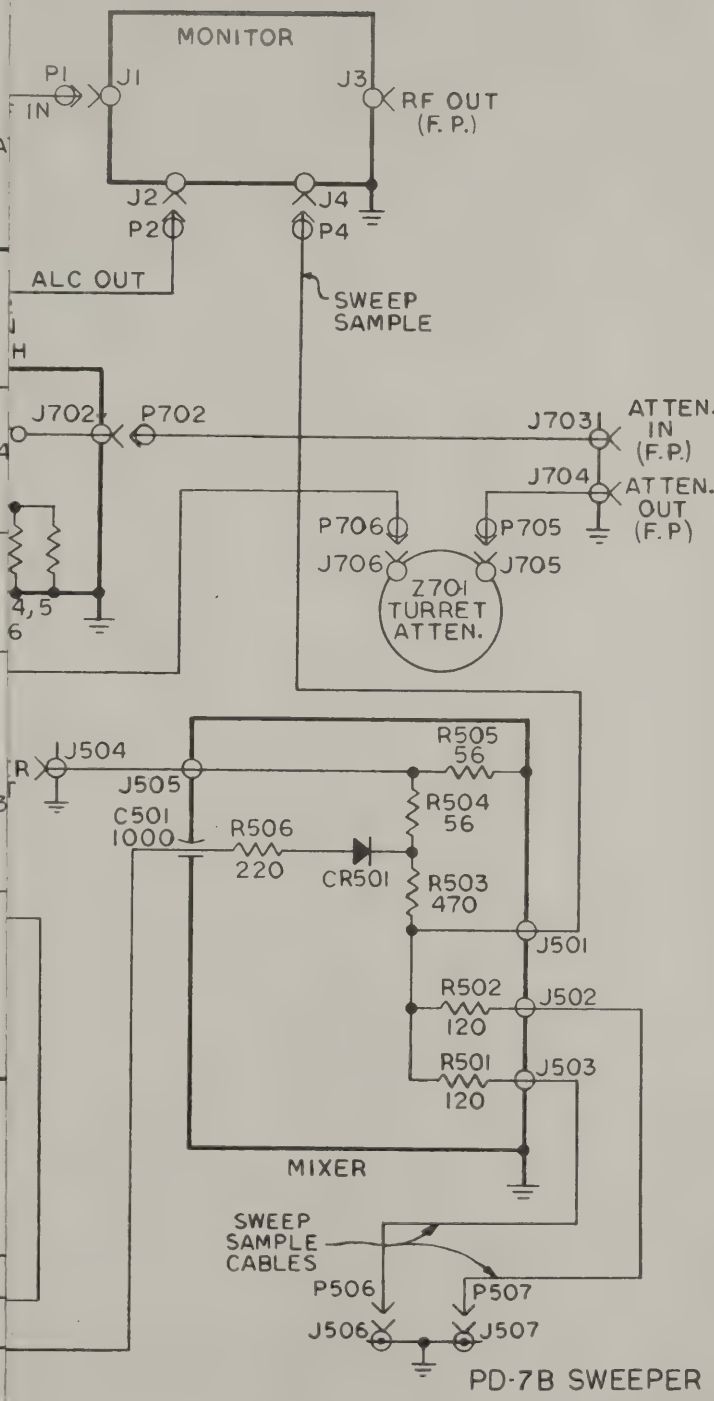


Figure 5-3. PD-7B Sweeper

Electrical Parts List

Sweeper

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
C501	CFCF, 1000pF, 1000VDCW	Erie Resistor Corp	102PZ5V0	21-0004-01
C801	Not assigned			
C802	Not assigned			
C803	CFT, 3pF, P.O. Assy No. 975067	Telonic		NA
C804	CFCF, 1000pF, 500VDCW	Aerovox Corp	BSS-1BB	21-0013-01
C805	Same as C804			
C806	Same as C804			
C807	Same as C804			
C808	CFT, 10pF, P.O. Assy No. 975067	Telonic		NA
C809	CVA, 0.1-5pF, P.O. Assy No. 975067	Telonic		NA
C810	Same as C808			
C811	CVA, 0.01-1pF, P.O. Assy No. 975067	Telonic		NA
C812	Same as C805			
C813	CVA, 0.5-2pF, P.O. Assy No. 975067	Telonic		NA
CR501	DS, 1N82AL	Sylvania Elect	1N82AL	41-0001-01
J501	Receptacle, Elect	Dage Electric	MX 1684/W	44-0009-01
J502	Same as J501			
J503	Same as J501			
J504	Receptacle, Elect	Dage Electric	2559-1	44-0011-01
J505	Same as J501			
J506	Receptacle, Elect	Telonic		44-0020-01
J507	Same as J506			
J701	Receptacle, Elect	Star-Tronics	5284-1	44-0082-01
J702	Receptacle, Elect	Dage Electric	8107-1	44-0038-01
J703	Receptacle, Elect	Dage Electric	30150-1	44-0203-01
J704	Same as J703			
J805	Receptacle, Elect	Dage Electric	816-1	44-0054-01
L801	IF, 10μH, P.O. Assy No. 975067	Telonic		NA
L802	Same as L801			
L803	IV, 0.02-1.2μH, Front Tuning	Telonic		33-0013-01
L804	IV, 0.02-1.2μH, Rear Tuning	Telonic		33-0012-01

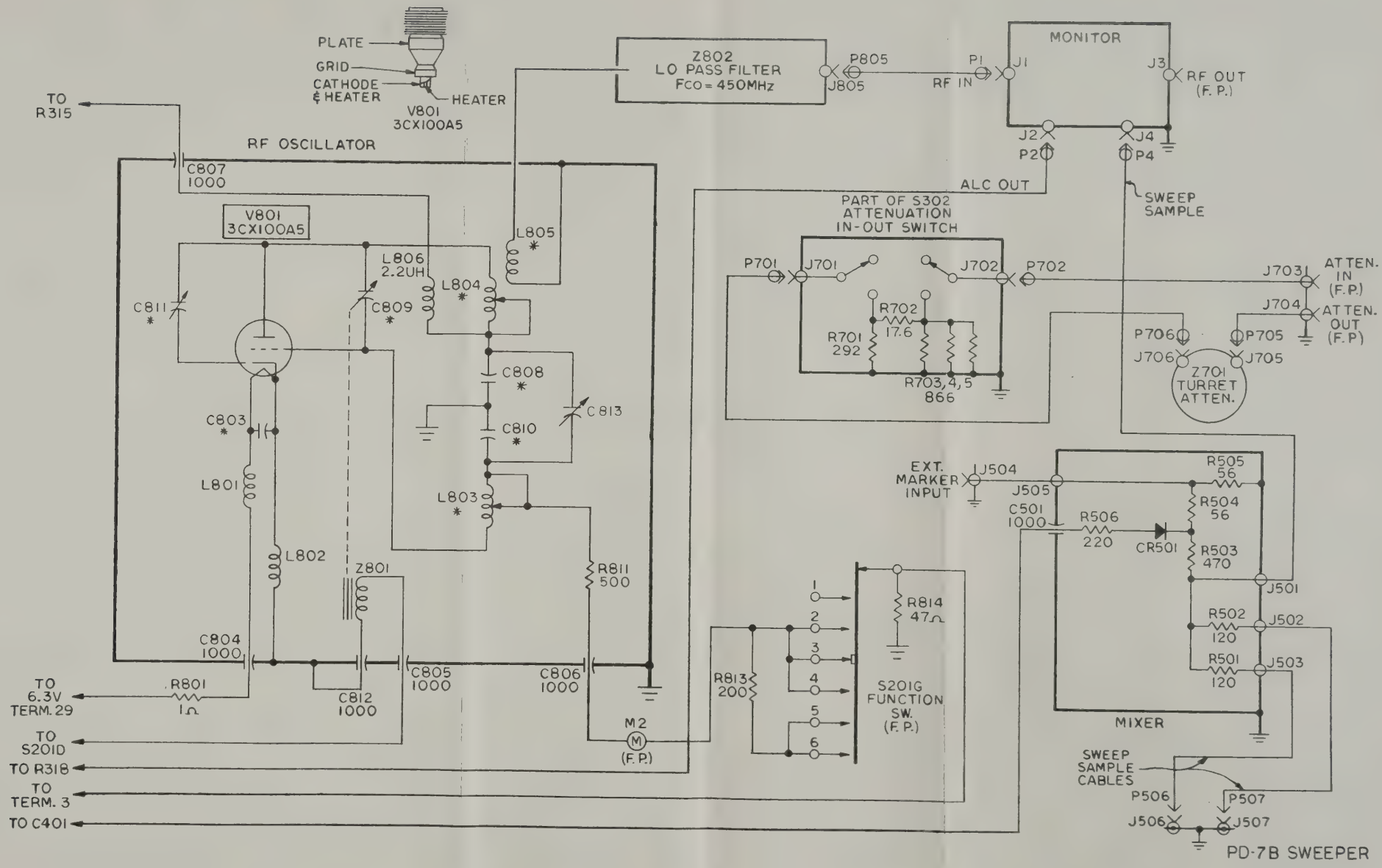
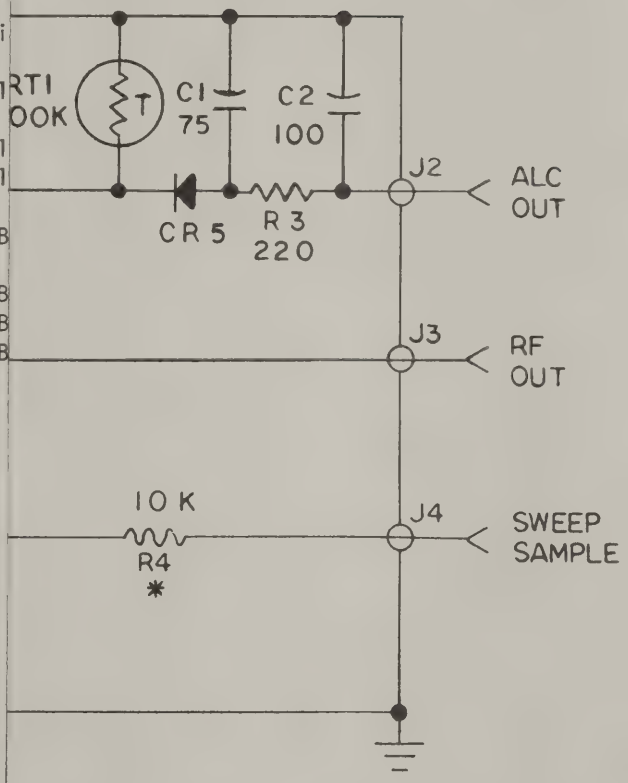


Figure 5-3. PD-7B Sweeper

Electric

Monitor (Ass

Circuit Ref	Description	T Manu
C1	CFD, 75pF, 500VDCW	Aerovox
C2	CFD, 100pF, 500VDCW	Aerovox
C3	CFD, 0.001µF, 1000VDCW	RMC
CR5	DS, 1N34AS	Sylvani
J1	Receptacle, Elect	Special
J2	Connector, Elect'	Star
J3	Receptacle, Elect	Dage El
J4	Receptacle, Elect	Dage El
R1	RFC, 1kΩ, ±10%, 1W	Allen-B
R2	RFMF, 200Ω, ±1%, 1/2W	IRC
R3	RFC, 220Ω, ±5%, 1/4W	Allen-B
R4	RFC, 10kΩ, ±10%, 1/2W	Allen-B
R5	RFC, 22kΩ, ±5%, 1/4W	Allen-B
RT1	Thermistor 100kΩ	Fenway



ASSY NO. B970613

4. Monitor

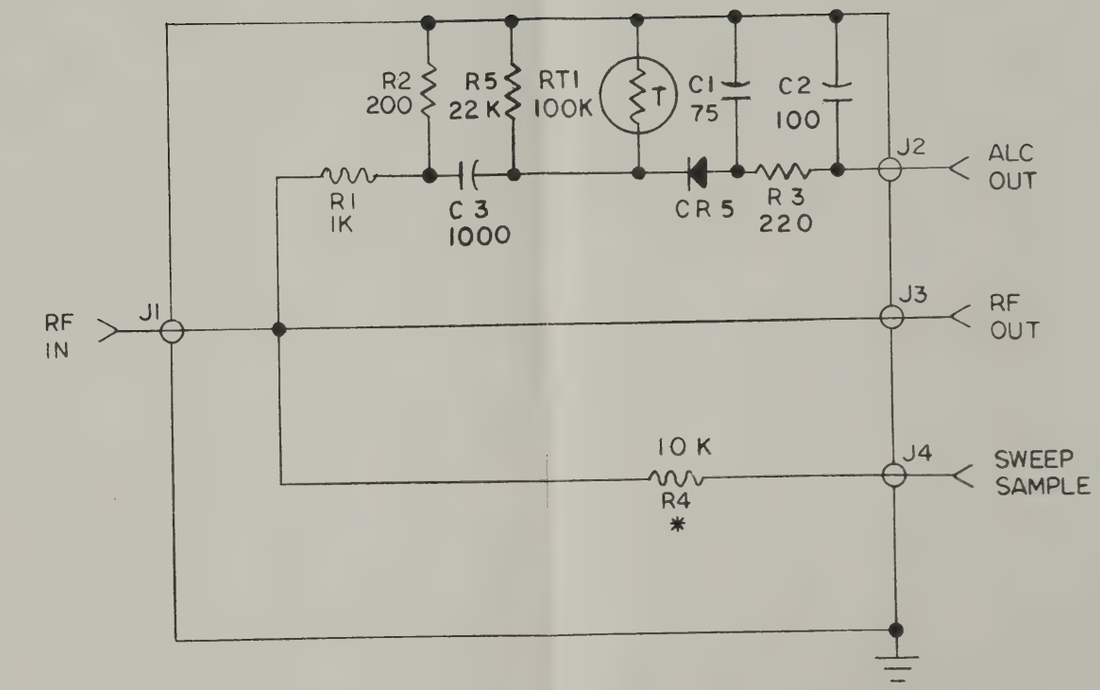
Figure 5-4
5-13/5-14

TABLE 5-5.

Electrical Parts List

Monitor (Assembly No. 970613)

Circuit Ref	Description	Typical Manufacturers	Manufacturers Part No.	Telonic Part No.
C1	CFD, 75pF, 500VDCW	Aerovox	5506-0006	21-0039-01
C2	CFD, 100pF, 500VDCW	Aerovox	5506-0007	21-0045-01
C3	CFD, 0.001µF, 1000VDCW	RMC	Type C	22-0005-01
CR5	DS, 1N34AS	Sylvania Elect	1N34AS	41-0008-01
J1	Receptacle, Elect	Specialty Connector	24JR103-1	44-0066-01
J2	Connector, Elect	Star	5138	44-0191-01
J3	Receptacle, Elect	Dage Elect	019-1	44-0050-01
J4	Receptacle, Elect	Dage Elect	4234-1	44-0044-01
R1	RFC, 1kΩ, ±10%, 1W	Allen-Bradley	GB1021	28-0009-01
R2	RFMF, 200Ω, ±1%, 1/2W	IRC	CEC T-0	27-0225-02
R3	RFC, 220Ω, ±5%, 1/4W	Allen-Bradley	CB2215	26-1523-01
R4	RFC, 10kΩ, ±10%, 1/2W	Allen-Bradley	EB1031	26-0023-01
R5	RFC, 22kΩ, ±5%, 1/4W	Allen-Bradley	CB2235	26-0505-01
RT1	Thermistor 100kΩ	Fenway	QA51J1	25-0004-01



ASSY NO. B970613

Figure 5-4. Monitor

ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
1	57-0283-01	1	P.C. Board	
2				
3				
4	22-0001-08	1	CFD, 20 pF	C1
5	22-0005-01	1	CFD, 1000 pF	C2
6				
7	26-1524-01	2	RFC, 47kΩ, ±10%, 1/4W	R2,3
8	26-1522-01	2	RFC, 100Ω, ±10%, 1/4W	R8,9
9	26-1536-01	1	RFC, 220kΩ, ±10%, 1/4W	R1
10	26-1541-01	4	RFC, 470kΩ, ±10%, 1/4W	R4,5,7,10
11	26-1525-01	1	RFC, 100kΩ, ±10%, 1/4W	R12
12	29-0130-07	2	RVC, 10kΩ, 3/4W	R6,11
13				
14	40-0100-01	2	TR, MPSL-51	Q1,2
15	40-0088-01	2	TR, 2N 5184	Q3,4
16	41-0022-01	2	DS, 1N 3064	CR1,2
17	41-0054-01	1	DSZ, 1N 821	CR3
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	BY	NAME	DATE
APVD			
ENG			
CHK	P.MARX	KH	11/10/71
			9/15/71

telonic™

TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel: 714 494-9401 • TWX: 910 596-1320

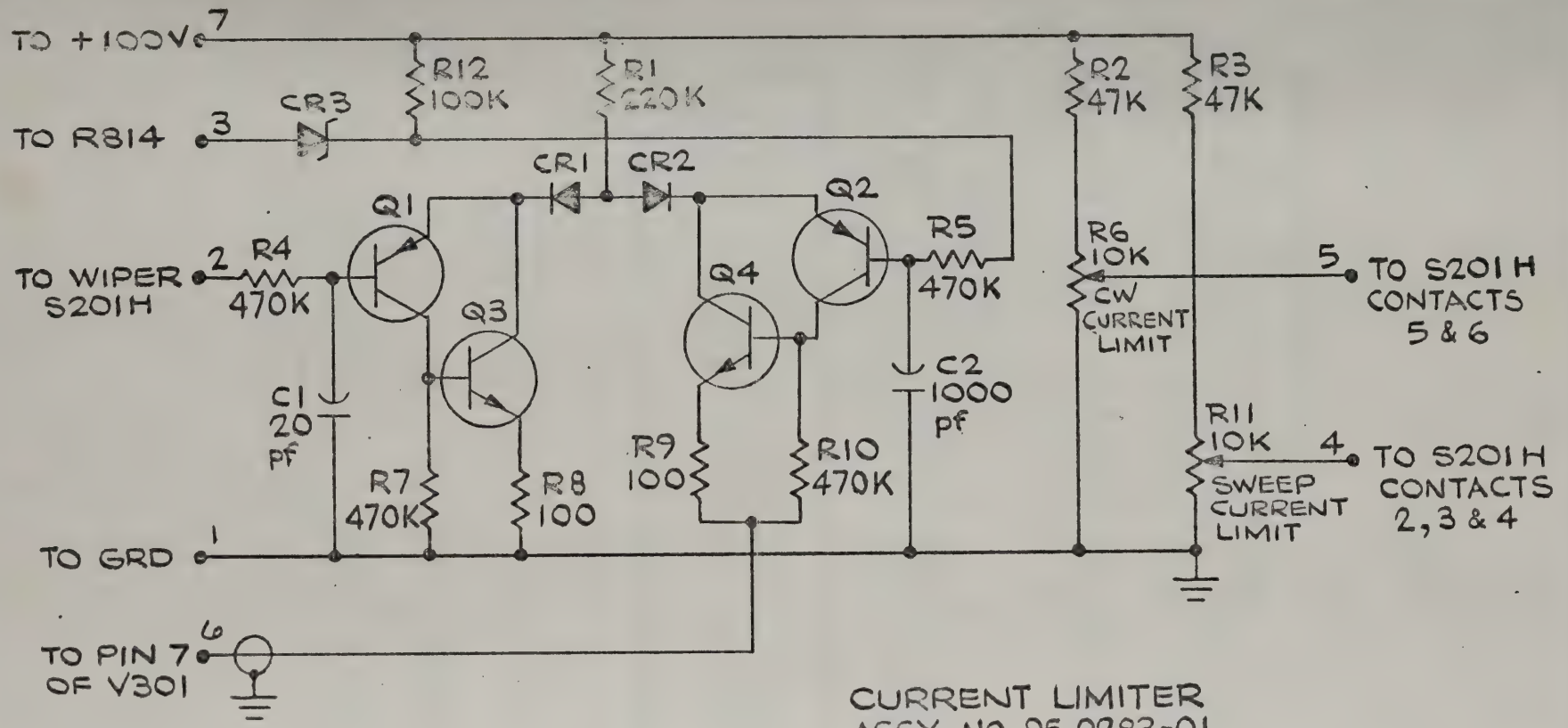
PARTS LIST

TITLE: ASSEMBLY, PCB, CURRENT LIMITER

REL ECN 6075 | SH 2 OF 2 | SIZE A | DWG NO 95-0283-01 | REV

95-0283

54-0283-01



CURRENT LIMITER
ASSY NO. 95-0283-01

LET	REVISION	DATE

TOLERANCES		NAME	DATE
FRACT. ± 1/64	DR	S. MORALES	11/8/71
.XX ±.01	CHK	P. MARX	11/10/71
.XXX ±.005	ENGR		
ANG. ±1°	APVD		

telonic

TELONIC INDUSTRIES, INC.
21282 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel: 714 494-9401 • TWX: 910 596-1320

TITLE SCHEMATIC, CURRENT LIMITER

SH 1 OF 1	SIZE	DWG NO	REV
REL ECN 6075	A	54-0283-01	

PD-2B, 3B, 7B, 9B

WARRANTY

TELONIC INSTRUMENTS AND ACCESSORIES

Products manufactured by TELONIC INDUSTRIES, INC. are guaranteed against defective materials and workmanship for a period of one year (vacuum tubes excepted) from date of purchase. This warranty does not apply to instruments that have been altered, improperly handled or damaged in any way beyond our control.

Instruments must be examined immediately upon receipt, since claims for damage in transit will not be honored by the carrier unless prompt action is taken.

CHANGES IN SPECIFICATIONS

The right is reserved to change the published specifications of equipment at any time, and to furnish merchandise in accordance with current specifications, without incurring any liability to modify equipment previously sold.

CUSTOMER RETURN OF EQUIPMENT (REPAIR, REPLACEMENT, DUPLICATION, OTHER CREDIT)

All customer returns require authorization from Telonic Industries, Inc. prior to shipment of equipment (Request for Equipment Return, Form #4019). Any equipment returned without authorization for shipment will be at the customer's or distributor's expense.

Instructions for Processing "Request for Equipment Return", Form #4019:

1. Customer completes top portion of Form #4019.

2. Customer forwards original and one carbon copy of Form #4019 to Telonic Industries, Inc.; retain 3rd carbon copy of Form #4019 in customer file.

3. Telonic Industries, Inc. completes bottom portion of Form #4019 and authorizes return of equipment (if approved).

4. Telonic Industries, Inc. returns the authorized original copy of Form #4019 to customer with instructions for shipment of equipment. Telonic Industries, Inc. retains one carbon copy of Form #4019 in file.

REQUEST FOR EQUIPMENT RETURN

CUSTOMER NAME: _____ DATE: _____

SHIP TO ADDRESS: _____ ORIGINAL P. O. NO: _____

_____ ORIGINAL INVOICE NO: _____

ITEM	QTY.	DESCRIPTION	MODEL NUMBER	SERIAL NUMBER	UNIT PRICE	TOTAL

REASON FOR RETURN:

RETURN FOR:

- Repair-Warranty (no charge) ☐
- Repair-Out of Warranty (charge) ☐
- Repair-Demo (no charge) ☐
- Replacement (no charge) ☐
- Replacement (charge) ☐
- Demo (credit only) ☐
- Duplication (credit only) ☐
- Other (specify) ☐ _____

INSURE AT CUSTOMER EXPENSE ☐
(Specify agent)

_____

(TO BE COMPLETED BY TELONIC)

SHIPPING INSTRUCTIONS:

Ship via:

- Air Freight ☐
- Sea Freight ☐
- Air Parcel Post ☐
- Parcel Post ☐
- Truck ☐
- UPS ☐
- Air Express ☐
- Other (specify) ☐ _____

Prepaid ☐
Collect ☐

INSURE AT TELONIC EXPENSE ☐ (Property of Telonic only) Agent: _____

COMMENTS:

RETURN AUTHORIZED: _____ DATE: _____

Telonic Industries, Inc.
P. O. Box 277
Laguna Beach, California, USA 92652

REQUEST FOR EQUIPMENT RETURN

CUSTOMER NAME: _____ DATE: _____

SHIP TO ADDRESS: _____ ORIGINAL P. O. NO: _____

_____ ORIGINAL INVOICE NO: _____

ITEM	QTY.	DESCRIPTION	MODEL NUMBER	SERIAL NUMBER	UNIT PRICE	TOTAL

REASON FOR RETURN:

RETURN FOR:

- Repair-Warranty (no charge) ☐
- Repair-Out of Warranty (charge) ☐
- Repair-Demo (no charge) ☐
- Replacement (no charge) ☐
- Replacement (charge) ☐
- Demo (credit only) ☐
- Duplication (credit only) ☐
- Other (specify) ☐ _____

INSURE AT CUSTOMER EXPENSE ☐
(Specify agent)

_____

(TO BE COMPLETED BY TELONIC)

SHIPPING INSTRUCTIONS:

Ship via:

- Air Freight ☐
- Sea Freight ☐
- Air Parcel Post ☐
- Parcel Post ☐
- Truck ☐
- UPS ☐
- Air Express ☐
- Other (specify) ☐ _____

Prepaid ☐
Collect ☐

INSURE AT TELONIC EXPENSE ☐ (Property of Telonic only) Agent: _____

COMMENTS:

RETURN AUTHORIZED: _____ DATE: _____

Telonic Industries, Inc.
P. O. Box 277
Laguna Beach, California, USA 92652

REQUEST FOR EQUIPMENT RETURN

CUSTOMER NAME: _____ DATE: _____

SHIP TO ADDRESS: _____ ORIGINAL P. O. NO: _____

_____ ORIGINAL INVOICE NO: _____

ITEM	QTY.	DESCRIPTION	MODEL NUMBER	SERIAL NUMBER	UNIT PRICE	TOTAL

REASON FOR RETURN:

RETURN FOR:

- ☐ Repair-Warranty (no charge)
- ☐ Repair-Out of Warranty (charge)
- ☐ Repair-Demo (no charge)
- ☐ Replacement (no charge)
- ☐ Replacement (charge)
- ☐ Demo (credit only)
- ☐ Duplication (credit only)
- ☐ Other (specify) _____

INSURE AT CUSTOMER EXPENSE ☐
(Specify agent)

_____

(TO BE COMPLETED BY TELONIC)

SHIPPING INSTRUCTIONS:

Ship via:

- ☐ Air Freight
- ☐ Sea Freight
- ☐ Air Parcel Post
- ☐ Parcel Post
- ☐ Truck
- ☐ UPS
- ☐ Air Express
- ☐ Other (specify) _____

- ☐ Prepaid
- ☐ Collect

INSURE AT TELONIC EXPENSE ☐ (Property of Telonic only) Agent: _____

COMMENTS:

RETURN AUTHORIZED: _____ DATE: _____

Telonic Industries, Inc.
P. O. Box 277
Laguna Beach, California, USA 92652

Form No. 4019